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THE ANDREWES DIAZO REACTION: ITS PRESENCE AND SIGNIFICANCE IN EXPERIMENTAL RENAL INSUFFICIENCY.

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AND

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DURING the course of our recent work on experimental renal disease produced by irradiation, the comparatively large series of animals used furnished a constant supply of material suitable for experimental study. In addition to utilizing this for the stated purposes of the investigation itself, namely, the production and functional study of a standardized experimental nephritis, we also made use of it by carrying out an investigation of the diazo reaction given by uræmic serum, to which attention was first drawn by Andrewes. This study, we felt, might be made with some advantage, as a relatively small amount of work had been carried out along this line in laboratory animals and some of this was found to be contradictory. Moreover, we thought it might be well to call attention once more to this simple test for severe renal insufficiency, which appears to have considerable prognostic value, but is not, so far as we are aware, utilized to any great extent in this part of the world and certainly has received no detailed study. Our experiments led us on to a further study of the chemical basis of the reaction which, despite the one previous and apparently conclusive investigation, does not appear to be widely appreciated.

HISTORICAL.

In 1924 C. H. Andrewes,[1] while engaged in a study of the Van den Bergh reaction for hyperbilirubinæmia, made for the first time the observation that on adding the diazotized sulphanilic acid to an alcoholic extract of the serum of patients with advanced renal disease, a buff colour appeared instead of the well-known pink, which on the addition of alkali twenty-four hours later gave place to a cherry-red of variable duration. This colour did not appear in the serum of any other patients.

A few months later Becher,[2] working independently and with a different technique, made the same observation and regarded his findings as resting on the same unknown basis as those of Andrewes, though this point is disputed by subsequent observers.

Hewitt[3] in 1925, working with clinical material, again confirmed the occurrence of this reaction in uræmic serum and made the important observation that boiling the alcoholic serum extract with the diazo reagent for a short time eliminated the necessity of waiting twenty-four hours till addition of the alkali would produce the reaction in weakly reacting samples of serum.

About the same time after a clinical study of the reaction Rabinowitch[4] emphasized the grave prognostic significance of the reaction and reported that a positive response to the test was obtained only in the blood of patients in whom there was retention of waste products, while in those in whom arterial disease was predominant, there was no reaction to the test.

In 1927 Blotner and Fitz[5] made a further clinical study and again emphasized the value of the test in prognosis and stressed its great value in the differentiation of uræmic coma from coma of extrarenal origin. They noted that there was no definite parallelism between the urea content of the blood and the Andrewes reaction and obtained a reaction with a sample of blood whose urea content was as low as fifty-six milligrammes per hundred cubic centimetres. They also obtained a reaction with the serum of two rabbits and one dog as early as one or two days after bilateral nephrectomy.

Harrison and Hewitt[6] summarized the work up till 1927 and estimated the reaction in the blood and cerebro-spinal fluid over a series of clinical cases. They found that the substance responsible for the reaction did not appear to pass into the cerebro-spinal fluid. They mention also that the blood of uræmic patients often gives the reaction *post mortem*.

Edmund Andrews,[7] in contrast with Blotner and Fitz, failed to obtain reactions after bilateral nephrectomy and bilateral ureteral ligation, but on injection of large amounts of hypertonic saline solution the reaction appeared within a short time. Hunter and Montgomery,[8] however, obtained uniformly positive responses in nephrectomized rabbits and dogs. They also in common with other observers found the reaction could be elicited in normal urine.

Davis[9] in 1928 reported three cases of chronic nephritis in which positive reactions were obtained.

Eastland and Schmidt[10] recently made a fairly extensive clinical investigation of the reaction in forty-eight patients suffering from renal disease of various types and four hundred and sixty-eight with extrarenal lesions. They almost invariably found the result of the test positive in the presence of definite retention of nitrogenous products and under no other conditions and found it of considerable diagnostic and prognostic aid in advanced or extensive renal damage.

Shortly before this Harrison and Bromfield,[11] after a series of experiments carried out with the object of determining the nature of the substance causing the reaction, came to the conclusion that in all probability this substance was indican (potassium indoxyl sulphate) or possibly indoxyl glycuronate.

The only work carried out on animals with renal insufficiency due to causes other than bilateral nephrectomy (or ureteral ligation) was done by Andrewes who obtained a buff colour, but no cherry-red, in tests carried out on three rabbits; of these

one died as the result of a pharyngeal neoplasm, the other two from nephritis. One of the latter had a blood urea concentration above 100 milligrammes per 100 cubic centimetres, while in the remaining two it was above 300 milligrammes.

TECHNIQUE.

The method used by us for the purpose of producing the experimental renal lesion has already been given in detail in previous articles.[12] [13] Briefly it consists in surgically delivering one kidney on to the loin and exposing it to a measured dosage of X rays (about fifteen human erythema doses in one series, half that amount in another). This procedure is either preceded or followed by opposite nephrectomy, so that the animal, having to live only on the kidney exposed to X rays, develops renal insufficiency, the severity of which varies, according to the dosage of X rays employed and the weight of the dog, from death at a period between thirty and forty days after the exposure to X rays to almost complete recovery. In addition to investigating the reaction in these animals, we also studied it after bilateral nephrectomy and also in dogs following bilateral implantation of the ureters into the bowel.

The technique used was the original method of Andrewes as modified by Hewitt. Briefly this method is as follows. To two cubic centimetres of either serum or oxalated plasma (we always used oxalated plasma) twice this volume of alcohol is added and the resultant precipitate is separated by centrifugalization or filtration. Four cubic centimetres of the alcoholic extract are necessary for the estimation of the reaction. This was obtained simply and with quite sufficient accuracy by pouring off the supernatant fluid which is roughly four cubic centimetres in volume.

The diazo reagent is identical with that used for the Van den Bergh test and is prepared from the following two solutions:

Solution A—

Sulphanilic acid: 1 gramme.
Concentrated hydrochloric acid: 15 cubic centimetres.
Distilled water to 1,000 cubic centimetres.

Solution B—

Sodium nitrite: 0·5 gramme.
Distilled water to 100 cubic centimetres.

The reagent is prepared by mixing twenty-five cubic centimetres of solution *A* with 0·75 cubic centimetre of solution *B*. To the four cubic centimetres of the alcoholic extract one cubic centimetre of the diazo reagent is added and the mixture boiled for about half a minute. After this procedure, if the reaction is going to be positive, a buff colour appears. A few drops of a 20% solution of sodium hydrate are carefully added, upon which a positive reaction is indicated by a cherry-red coloration, a failure to react by no change in colour.

We have estimated the reaction in a series of over a hundred and fifty instances which will be discussed in some detail. We shall refer to the reaction as "+," "++" or "+++" according to the period for which the cherry-red coloration persists, and with the same standards as used by Eastland and Schmidt, that is, when the colour remains fifteen minutes or less "+" is used, "++" when it remains for any period between fifteen and sixty minutes, "+++" if for longer than sixty minutes.

During the latter part of the investigation we sought by simultaneous determination of the presence of the Andrewes reaction and hyperindicanæmia to throw some light on the relation of these two reactions. As previously mentioned, Harrison and Bromfield considered them identical in the light of their chemical experiments.

For the determination of the presence or absence of indican we used a qualitative form of the Jolles[14] method of indican estimation. Two cubic centimetres of blood plasma are mixed with two cubic centimetres of a 20% solution of trichloracetic acid and the mixture is centrifuged or filtered. To two cubic centimetres of the supernatant fluid are added one cubic centimetre of thymol alcohol 5%, and ten cubic centimetres of Obermayer's reagent (a solution of four grammes of ferric chloride in one litre of concentrated hydrochloric acid) and the whole is mixed well and allowed to stand for twenty minutes. Two cubic centimetres of chloroform are next added and well mixed. If a well-marked lavender colour appears immediately in the chloroform extract which sinks to the bottom, the reaction is "+++," if only a faint colour appears immediately the reaction is "++," if the colour only appears after standing (but not longer than overnight) the reaction is "+."

The blood urea was determined by the urease method of Marshall as described by Maclean.[15]

RESULTS OF INVESTIGATION.

The Andrewes Reaction after Bilateral Nephrectomy.

In Table I will be found the findings obtained in two dogs, X and Y, in which bilateral nephrectomy was carried out, giving the Andrewes reaction and coincident blood urea values from the time of operation till death. In both cases the reaction became positive within twenty-four hours and remained positive, increasing in intensity till death. It was less intense for some reason in dog Y than in dog X,

TABLE I.

Findings after Bilateral Nephrectomy in Dogs X and Y.

Subject of Experiment.	Hours after Operation.	Blood Urea (Milligrammes).	Andrewes Reaction.	Duration in Minutes.
Dog X (died eighty-four hours after operation)	0	91	−	
	24	148	+	70
	30	186	++	30
	48	276	++	45
	54	307	++	50
	72	394	++	55
	78	425	++	45
Dog Y (died seventy-two hours after operation)	1	30	−	
	6	65	−	
	24	187	+	9
	48	294	+	10
	72	394	++	16

but the point of importance is that it was definitely and repeatedly present in both dogs, as would be expected in the presence of such a grave degree of renal insufficiency as was found. The statements made by some observers to the effect that a positive reaction does not appear after bilateral nephrectomy, were not borne out. Indeed, seeing that a positive reaction is admittedly present in severe renal insufficiency due to other causes, a logical explanation for such a condition of affairs would be very difficult to find.

After Bilateral Ureteral Transplantation.

Table II shows the findings in a dog in which both ureters were transplanted into the bowel for purposes of another investigation. The ureters were implanted at a level sufficiently high in the alimentary tract for renal insufficiency to develop. The blood urea gradually rose, reaching a level of 233 milligrammes per 100 cubic centimetres twenty-seven days after operation. At this period for the first time a positive Andrewes reaction was present. The reaction remained positive for six days, during which the blood urea fell to 164 milligrammes. On the thirty-fifth day, with a higher blood urea (183 milligrammes), no reaction resulted and none was obtained till the forty-first day, when, with a urea value of 147 milligrammes, the reaction became positive again. Three days later it was "+ +," lasting for twenty-five minutes. Since then no reaction has been obtained, the blood urea gradually falling to a level of 61. It will be seen that with the onset of severe renal insufficiency the reaction became positive and with the gradual recovery from the renal insufficiency the reaction again failed to appear; but, while it gave an indication of the general trend of the disease, its presence and intensity did not correspond closely to the fluctuations in the blood urea.

TABLE II.

Findings in Dog Z after Bilateral Ureteral Transplantation.

Days after Operation.	Blood Urea (Milligrammes).	Andrewes Reaction.	Duration.
0	40	−	
1	72	−	
2	86	−	
3	85	−	
5	119	−	
7	111	−	
9	138	−	
12	128	−	
15	110	−	
19	137	−	
23	172	−	
27	233	+	20 seconds
29	221	+	12 minutes
33	164	+	Few seconds
35	183	−	
38	160	−	
41	147	+	Few seconds
44	168	++	25 minutes
47	141	−	
51	121	−	
55	101	−	
70	61	−	

In Experimental Renal Disease Produced by Irradiation.

In Table III are listed our observations in a series of dogs in which the above lesion was produced.

TABLE III.

Andrewes Reactions and Blood Urea Values in Dogs suffering from Experimental X Ray Nephritis. A series of forty-four failures to react, the blood urea being in each case below 130 milligrammes per 100 cubic centimetres is not included.

Dog.	Urea (Milligrammes).	Andrewes Reaction.	Remarks.
D17	130	−	Still living, with chronic uræmia.
D17	130	+	Still living, with chronic uræmia.
C56	131	−	Later positive, with death from uræmia.
P9	132	−	Death from Vincent's angina.
D25	135	−	Moderate recovery from nephritis. Reaction never positive.
E2	136	−	Moderate recovery from nephritis. Reaction never positive.
A59	139	−	Later positive, with death from uræmia.
D17	144	−	Still living, with chronic uræmia.
C56	145	−	Later positive, with death from uræmia.
D17	151	−	Still living, with chronic uræmia.
A60	154	+	Thirty-four days after irradiation. Death on thirty-eighth day.
A60	155	+	Thirty-six days after irradiation. Death on thirty-eighth day.
C56	156	−	Later positive. Death from uræmia.
C49	165	−	Death from pneumonia.
D17	169	−	Later positive. Chronic uræmia.
C56	171	−	Later positive. Death from uræmia.
D17	178	−	Later positive. Chronic uræmia.
A55	178	−	Later positive. Death from uræmia.
D17	186	−	Later positive. Chronic uræmia.
E4	187	−	Death from pneumonia.
A53	192	+	Thirty-eight days after irradiation. Death on forty-fifth day.
D17	195	+	Still living. Chronic uræmia.
E2	196	−	Moderate recovery from nephritis. Reaction never positive.
A54	198	−	Later positive. Death from uræmia.
D17	200	+	Still living. Chronic uræmia.
C42	204	−	Later positive. Killed.
A53	204	+	Forty days after irradiation. Death on forty-second day.
C56	204	−	Later positive. Death from uræmia.
C56	210	−	Later positive. Death from uræmia.
C56	213	+	Died from uræmia three days later.
C64	220	−	Death from uræmia four days later, with positive Andrewes reaction.
C42	220	+	Killed for histological study.
C56	221	−	Death from uræmia five days later, with positive Andrewes reaction.
C56	223	+	Death twenty-two days later from uræmia.
C48	223	+	Death nine days later from uræmia.
C56	231	+	Death twenty-six days later from uræmia.
C56	253	−	One hundred and sixty-third day. Previously positive. Later positive with death from uræmia.
A55	260	+++	Dying from uræmia.
D17	267	+	Still living. Chronic uræmia.
B6	268	+	Chronic uræmia culminating in death.
A60	274	++	Dying from uræmia.
C48	275	+	Death twelve days later from uræmia.
C56	286	+	One hundred and sixtieth day. Death on one hundred and ninety-ninth day.
C47	290	+	Killed by other dogs.
A53	296	+++	Death three days later from uræmia.
C50	298	−	Died twenty days later from uræmia.
C50	300	+	Died six days later from uræmia.
D20	318	−	Seventy-six days after irradiation. Death on eighty-first, with positive reaction.
C56	320	−	One hundred and sixty-first day. Previously positive. Later again positive with death from uræmia.
C42	339	−	Later positive, with lower blood urea.
B6	343	+	Chronic uræmia culminating in death.
C48	355	+++	Dying from uræmia.
B6	365	+	Chronic uræmia culminating in death.
B6	373	+	Chronic uræmia culminating in death.
C56	384	+++	Death same day from uræmia.
B6	397	+	Chronic uræmia culminating in death.
C64	405	++	Death next day from uræmia.
B6	410	++	Chronic uræmia culminating in death.
A54	441	++	Fortieth day. Death from uræmia on forty-third day.
C56	443	+++	Dying from uræmia.
C64	474	+++	Dying from uræmia.
P23	487	+	Dying from uræmia.
A54	490	+++	Death next day from uræmia.
C57	495	++	Dying from uræmia.
C50	518	+++	Dying from uræmia.
A55	558	+++	Dying from uræmia.
C40	600	+++	Dying from uræmia.
A54	691	+++	Dying from uræmia.

In the dogs of series A and B the full standard dosage of X rays (thirty minutes' exposure) was given, followed by nephrectomy in series A, preceded

by it in series B, while in series C and D half this dosage was used, followed by nephrectomy in series C, preceded by it in series D. Series E and F received a different dosage again. Forty-four observations are not listed in the table; in all these there was a blood urea of less than 130 milligrammes per hundred cubic centimetres, with a failure of reaction to the Andrewes test. Some of these dogs recovered from the renal lesion without ever developing a positive reaction, some died from causes other than renal insufficiency, while others later developed a positive reaction which of course appears in the table.

Comparing the Andrewes reactions with the blood urea values, it will be seen that the lowest blood urea concentration associated with a positive reaction was 130 milligrammes in dog D17 which is still living with chronic uræmia. Above this figure is a series of failures to react, the next positive one being in dog A60, with 154 milligrammes of blood urea. The same animal two days later (two days before its death from uræmia) again manifested a positive reaction at the same blood urea level. With increasing blood urea levels in different dogs failures to react to the Andrewes test are met with up to urea values of 192 and 195 milligrammes, where positive reactions are again seen. Above 200 milligrammes positive reactions are encountered with rapidly increasing frequency until from 260 upwards they are practically the rule. They also increase in intensity, though this often fails to be proportionate to the degree of elevation of the blood urea. The first "++" reaction is met with at a blood urea level of 274 milligrammes, while the first "+++" occurs at 260 milligrammes. Even above this level failure to react or doubtful reactions are still encountered up to a level of 343 milligrammes, at and above which the level is uniformly positive. With still increasing blood urea levels, "++" and "+++" reactions become more frequent and are eventually the rule.

Table IV shows the progress of two dogs, A53 and C56, in terms of their blood urea and the Andrewes reaction during the course of the experimental nephritis, demonstrating the appearance of a positive reaction and its increased intensity as the disease advances. The illness of dog A53 ran a fairly acute course, while in dog C56 the disease was more chronic in type, with some fluctuation in intensity.

It will be seen from analysis of Table III that in the rapidly advancing renal insufficiency produced by the heavy dosage of irradiation used on the dogs of groups A and B, a positive Andrewes reaction was invariably present, followed by uræmic death. The value of the blood urea at the stage of the disease at which a positive reaction is first obtained, varies within fairly wide limits, just as the terminal value of the blood urea itself shows similarly wide variations in the different animals. In the dogs which received a smaller dosage of irradiation (groups C and D), the disease pursued a more subacute course with fluctuations in intensity and the Andrewes reaction would sometimes fail to appear after being positive. None of these animals, however, that gave a positive reaction at any time, recovered completely from the renal lesion, though some are apparently in excellent condition with a slightly impaired renal function which appears to be stationary. Other animals eventually died from renal insufficiency, while others have a well marked chronic uræmia. No dog suffering from X ray nephritis that gave a "++" or "+++" Andrewes reaction recovered from the renal lesion. All have died from uræmia, but, on the other hand, the animal in which bilateral ureteral implantation was carried out, in which a "++" reaction was on one occasion obtained, has shown definite improvement and has recovered at all events from the acute stage of his renal insufficiency.

TABLE IV.

Subject.	Duration of Disease (Days).	Urea (Milligrammes).	Andrewes Reaction.
Dog A53[1]	26	70	−
	28	79	−
	31	62	−
	35	121	−
	38	192	+
	40	204	+
	42	296	+++
Dog C56[2]	128	131	−
	138	204	−
	152	145	−
	160	286	+
	161	320	−
	163	253	−
	165	210	−
	167	156	−
	170	171	−
	173	231	+
	177	223	+
	191	250	+
	196	213	+
	198	384	+++
	199	443	+++

[1] Dog A53 received full standard dosage of irradiation and died on the forty-fifth day.

[2] Dog C56 received half standard dose of irradiation, was subjected to nephrectomy at fifty-three days and died on the one hundred and ninety-ninth day.

THE ANDREWES REACTION IN RELATION TO INDICANÆMIA.

With the object of throwing some light on the question of the relation of the Andrewes reaction to indicanæmia, first raised by Harrison and Bromfield,[11] we compared the two tests in a series of dogs suffering from experimental renal insufficiency induced by various means. For purposes of comparison we did not choose any of the classical quantitative indican tests, but preferred a qualitative one, since the Andrewes reaction, due to the instability of the coloured compound which is formed, is not adaptable to strict quantitative estimation.

In Table V is a list of a series of dogs in which simultaneous estimations of the Andrewes reaction and the qualitative Jolles reaction for indican, as described above, were carried out. It will be seen that every positive Andrewes reaction was associated with a positive indican reaction. Moreover, the indican test, in the form used by us, apparently

being more sensitive than the Andrewes test, every "+" Andrewes reaction, with one exception only, was associated with a "++" or "+++" indican reaction. Furthermore, every "++" or "+++" indican reaction, with one exception again, is associated with a positive Andrewes reaction ("+" or more), but in those cases in which the indican reaction was only weakly positive, all of which showed definite urea retention (the lowest level associated with a positive indican test being 65 milligrammes), the Andrewes test yielded no reaction.

Table V.

Andrewes and Indican Reactions in Experimental Renal Insufficiency.

Subject and Experimental Procedure.	Duration of Disease (Days).	Urea (Milligrammes).	Andrewes Reaction.	Indican Reaction.
Dog Y (hours) (bilateral nephrectomy)	1	30	−	−
	6	65	−	+
	24	187	+	++
	48	294	+	++
	72 (death)	394	++	++
Dog Z (bilateral ureteral transplantation)	15	110	−	−
	19	137	−	−
	23	172	−	+
	27	233	+	+++
	29	221	+	+++
	33	164	+	+++
	35	183	−	++
	38	160	−	+
	41	147	+	+
	44	168	++	+++
	47	141	−	−
	55	101	−	−
	70	61	−	−
Dog C64 (X ray nephritis; rapid death from uræmia after nephrectomy)	—	53	−	−
	3	220	−	−
	6	405	++	+++
	7 (death)	474	+++	+++
Dog C56 (X ray nephritis)	173	231	+	++
	177	223	+	++
	181	183		+
	185	273		+++
	191	250	+	++
	194	221		+++
	196	213	+	+++
	198	384	+++	+++
	199	443	+++	+++
Dog D17 (X ray nephritis)	185	186	−	+
	189	267	+	++
	190		−	−
	193	200	+	++
	197	151	−	+
	203	195	+	+++
	206	81	−	−
	208	130	+	++
	214	62	−	−
	217	130	−	−
	231	129	−	−
Dog C65 (X ray nephritis)	55	275	+	++
	57	475	++	+++
Dog C67 (X ray nephritis)	49	600	+++	+++
Dog C68 (X ray nephritis)	47	682	+++	+++

The Andrewes Reaction in Hæmolysed Blood.

Previous observers[6] have noticed that in blood obtained *post mortem* the Andrewes reaction has a tendency to diminish in intensity or to fail to occur. The same characteristic was noticed in our own series of experiments and received some study. We came to the conclusion that this change was due to the presence of hæmolysis.

In Table VI is the list of a series of dogs in which Andrewes and indican estimations were carried out shortly before death and at different times *post mortem* and with varying degrees of hæmolysis present in the blood under consideration. It will be seen from a study of the table that strongly hæmolysed blood does not give a positive Andrewes reaction, even in the presence of large amounts of indican as indicated by other tests or after a previous strongly positive Andrewes reaction in a non-hæmolysed specimen of the same blood (for example, as in dogs C65 and C67). Slight or moderate hæmolysis definitely diminishes the duration of the reaction (for example, C65) and inhibits a weak reaction altogether.

Table VI.

Andrewes and Indican Reactions in Post Mortem Blood.

Dog.	Nature of Blood.	Urea (Milligrammes).	Andrewes Reaction.	Indican Reaction.
X	*Ante mortem*	425	++ (45 minutes)	
	Several hours *post mortem*, moderately hæmolysed	512	+ (1 minute)	
Y	Taken at death ..	394	++ (15 minutes)	+++
	Taken five hours *post mortem*, moderately hæmolysed	361	−	+++
	Taken twenty-four hours *post mortem*, strongly hæmolysed	326	−	+++
C64	Taken *post mortem*, not hæmolysed	474	+++ (65 minutes)	+++
	Taken *post mortem*, slightly hæmolysed		++ (50 minutes)	+++
	Taken *post mortem*, moderately hæmolysed (seven hours later)		+ (10 minutes)	++
C65	Non-hæmolysed ..	460	+ (12 minutes)	++
	Moderately hæmolysed		+ (5 minutes)	++
	Strongly hæmolysed		−	+++
C67	Taken just before death, not hæmolysed	634	+++	+++
	Taken eight hours *post mortem*, moderately hæmolysed		−	+++
	Taken thirty-four hours *post mortem*, strongly hæmolysed		−	+++
C68	Taken just before death, not hæmolysed	682	+++	+++
	Taken one and half hours *post mortem*, not hæmolysed		+++ (70 minutes)	+++
	Taken four days *post mortem*, putrified oxalated plasma		+++ (70 minutes)	+++
	Putrified whole blood four days old		−	−

A further argument in favour of the absence of any other factor than hæmolysis in the interference with the reaction is provided in the case of dog C68 from which a specimen of oxalated plasma, from non-hæmolysed *post mortem* blood, was kept for four days at room temperature by which time putrefaction was quite pronounced. The Andrewes reaction and the indican reaction in this specimen were both of the same strength as in the fresh specimen. On the other hand, in a speeimen of whole blood from the same animal, kept under the same conditions for a similar period, at the end of which time the corpuscles were quite disorganized, the Andrewes and indican reactions both failed to occur.

From the above observations we conclude that *post mortem* changes in the intensity of the Andrewes reaction are due to hæmolysis.

NOTES ON THE TECHNIQUE OF THE INDICAN TEST, WITH THE ELABORATION OF A NEW METHOD OF INDICAN ESTIMATION.

We discovered early that it was possible to carry out an indican estimation on a specimen on which an Andrewes test had already been carried out. The lavender colour produced by this procedure is not quite so distinct as the one obtained in a straightforward Jolles test in a trichloracetic acid filtrate. Furthermore, the lavender coloured chloroform extract obtained from an alcoholic filtrate on which an Andrewes test had been done, changes in the course of twenty-four hours to a bluish-green which finally becomes a deep blue-green, increasing in intensity on further standing. This is quite in contrast to the behaviour of the lavender coloured extract obtained from a Jolles reaction carried out on a trichloracetic acid filtrate, which, although becoming somewhat more intense, retains its colour for several days and slowly changes to a blue colour on standing for more than a week.

In order to get some information regarding the nature of this slow reaction which takes place at room temperature, a series of experiments was performed at 100° C., which was expected to accelerate the reaction.

The diazo reagent of Andrewes was added to alcohol extracts of plasma with high indican content. After this the Andrewes test was either performed or omitted, this being immaterial. Then the reagents of the Jolles test (thymol alcohol and Obermayer's reagent) were added. The mixture was then put into a boiling water bath for forty minutes. After cooling, the mixture was extracted with ten cubic centimetres of chloroform. The chloroform takes up an intense dark blue colour which varies according to the indican content. In most cases this chloroform extract has to be diluted further, for example, by adding one cubic centimetre of the extract to ten cubic centimetres of chloroform. The colour present is a brilliant peacock blue which easily lends itself to colorimetric estimations.

Although to the moment due to lack of material we have not been able to synthesize on a sufficiently large scale the blue compound formed, we feel almost certain that it must be closely related to 4-cymol 2-indolindolignon. Jolles was able to prove by actual synthesis and molecular analysis that the lavender colour produced by his reaction is a hydrochloric acid salt of the above compound. Our reasons for the assumption of this relationship are as follows:

1. No chloroform-soluble colouring matter whatsoever is produced in the absence of thymol; we demonstrated this conclusively in a sufficient series of experiments.

2. The lavender chloroform extract, produced by the Jolles test, changes into the same blue colour, if the mixture is heated long enough.

This colour reaction apparently has not been previously observed, either by Jolles or by any subsequent observers. Besides affording the possibility of verifying the results of an Andrewes or indican test carried out with the Jolles technique, this test could well be elaborated to a colorimetric method of indican estimation. Compared with Jolles's original quantitative technique, it is performed in shorter time and the colour produced is more uniform and intense than that observed in Jolles's modified technique as described by Strauss.[17]

On the other hand, it is impossible to obtain a positive Andrewes reaction on a trichloracetic acid filtrate. Harrison and Bromfield[11] have already pointed out that to obtain a positive reaction a neutral filtrate has to be used. This might be considered as a possible argument against the common basis of the Andrewes and indican tests. This discrepancy we believe, however, may be explained as follows: It is well known that indoxyl may exist in at least two forms, ketoform and enolform. The formula of ketoform is shown in Figure I and that of enolform in Figure II. We may be

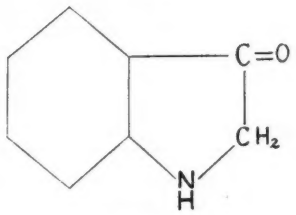

FIGURE I.

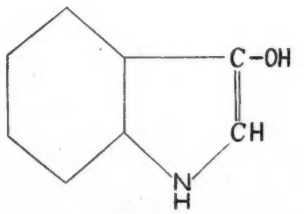

FIGURE II.

quite justified in assuming that the Andrewes reaction takes place with one form only and this is stable only in neutral solution. We have, of course, no knowledge of the exact mechanism of the Andrewes reaction which takes place, contrary to other diazo reactions, in a warm solution and in the absence of definite information some theorizing may be permissible.

DISCUSSION.

Indicanæmia as the Basis of the Andrewes Reaction.

Soon after the Andrewes reaction became known its basis came under discussion. Hewitt[3] in 1925 suggested that cyclic amines, such as histamine or tyrosine, might be responsible for it. Harrison and Bromfield[11] were unable to substantiate this hypothesis and as a result of work on normal urine came to the conclusion that the presence of indican (potassium indoxyl sulphate) was responsible for the reaction. The short report of these two workers indicates quite clearly that the Andrewes reaction

given by normal and pathological urine is due to the presence of indican. From these experiments on urine they concluded that the substance in uræmic serum responsible for the reaction is indican or possibly in part indoxyl glycuronate. Subsequent workers were apparently not much impressed by this communication, as no further effort has been made to prove or disprove the suggestion that indicanæmia may be the basis of the Andrewes reaction.

Reference, however, was made in a recent editorial in a leading medical journal[16] to the work of Harrison and Bromfield. It was taken more or less for granted not only that the Andrewes reaction is due to the presence of indicanæmia, but also that this reaction, as already assumed by Harrison and Bromfield, is the most convenient and sensitive means of determining the presence of indican in uræmic serum.

Apparently nobody has compared the Andrewes reaction with any of the more modern indican reactions in uræmic serum, though Harrison and Bromfield applied Jaffe's test which they found to be inferior to the Andrewes test. This is particularly remarkable in view of the fact that the classical indican test of Obermayer was worked out to a very simple and reliable quantitative determination of indican by Jolles[14] more than a decade ago.

On the basis of the experiments listed in Table V and already briefly summarized, we come to the conclusion that a positive Andrewes reaction is an indication of a well marked degree of indicanæmia which in turn points to a definite disorganization of renal function. With smaller amounts of indican present in the blood stream, as demonstrated by the modified Jolles technique, a positive Andrewes reaction is not obtained. Smaller amounts of indican again, such as may be met with in non-pathological blood or associated with gastro-intestinal disturbances, are not detected by the qualitative estimation used by us. In other words, our work strongly substantiates the statement made by Harrison and Bromfield that a well marked indicanæmia is the basis of the Andrewes reaction. The latter, however, is not, as implied in the reference already quoted, the most sensitive method for detection of indican. On the contrary, its sensitivity is comparatively low, being definitely less than that of the method used by us which in turn is a qualitative adaptation of an accurate quantitative technique.

Comparison of the Andrewes and Indican Reactions.

In carrying out the Andrewes test certain technical considerations have to be borne in mind. Although the test is a simple one, performed with a minimum of equipment (which is usually already in stock for the performance of the Van den Bergh test) care has to be taken not to miss weak reactions. Sometimes the red colour produced by adding the alkali is very faint and difficult to interpret. On other occasions the colour is of very short duration and doubt is again felt as to the interpretation. In our own series we regarded as failures to react those responses in which the colour lasted for less than three seconds. A further point to be kept in mind is that any excess of alkali may mask a weakly positive reaction or may diminish the duration of a strong one. On the other hand, the indican reaction as used by us is equally simple to carry out and it is not vitiated by any minor variations in technique. Less difficulty, moreover, is met with in the interpretation of border-line responses, since the colour present in positive reactions is observed in a colourless chloroform extract and is stable over a considerable period of time.

The indican test as employed by us is more delicate than the Andrewes test. This is really not such a great objection to the latter test, as this expressly indicates only gross nitrogenous retention.

The hyperindicanæmia associated with gastro-intestinal disturbances is not sufficiently great in amount as to give a positive reaction with either test.

The indican reaction has the slight drawback that in weak reactions a definite reading is not possible till twelve hours have elapsed. However, with more strongly positive reactions the reading can be made immediately and this places the test in this respect on a level with the Andrewes test.

It has the further advantage that it can be used in a quantitative form, for example, as in Jolles's original method or in the Strauss modification of this.

The indican test has the academic advantage that the colour produced is due to a well defined chemical compound, namely, the hydrochloric acid salt of 4-cymol 2-indolindolignon. On the other hand, the so-called diazo reaction of Andrewes is due to an unstable compound whose composition is not known. It is even very questionable whether we are really dealing with a true diazo reaction, since the reaction requires the application of heat, while true diazo reactions usually require the use of ice for their successful performance. Moreover, in diazo tests the reagents require to be used in molecular proportions and the diazo solution has to be freshly made, while these and other precautions do not need to be taken for successful Andrewes reactions to be carried out. Till it has been proved that the Andrewes reaction is a diazo reaction, we consider that there is an equal probability (amongst several other possibilities) of it being an isonitroso reaction of some kind, since it has been shown that indoxyl easily forms isonitroso compounds.

The indican reaction, not being interfered with by hæmolysis, possesses an advantage in this respect over that of Andrewes. The probable reason for this difference between the two reactions will now be discussed.

The Andrewes Reaction in Hæmolysed Blood.

As mentioned above, hæmolysis interferes with the Andrewes reaction to an extent varying directly with the degree to which this change has proceeded. On the other hand, its presence or absence exerted

no influence on the indican test that we used. The reason for this lies in the fact that the trichloracetic acid precipitates practically all the proteins present, including dissolved hæmoglobin, to a very complete extent. As is well known, alcohol is a less complete protein precipitant and leaves a certain amount of hæmoglobin in solution. In our own experiments we noticed consistently that alcoholic extracts from blood hæmolysed at all strongly had a yellowish-brown tinge, pointing to persistence of some hæmoglobin in solution. This hæmoglobin must be the disturbing factor, as we consider that our experiments have eliminated other potential factors that might vitiate the reaction. When the free hæmoglobin is completely removed with trichloracetic acid, the indican reaction is obtained as usual. We would stress the point that the absence of the Andrewes reaction in hæmolysed blood is not due to simple masking of the reaction by the colour of the dissolved hæmoglobin, since the colour produced by strongly positive reactions, though it would be far stronger than the yellowish-brown tinge due to the hæmoglobin, does not, in the presence of sufficient hæmolysis, appear at all. The interference which occurs, is apparently due to the presence of hæmoglobin as a chemical entity.

It is of interest to recall that C. H. Andrewes with *post mortem* blood obtained from nephritic animals obtained a buff colour, but no cherry-red. In view of our similar experiences hæmolysis must have been present in the experiments he describes.

Further Points in Technique.

We have already pointed out that although an Andrewes test cannot be carried out on a trichloracetic acid filtrate owing to the large amounts of acid necessarily present, the test for indican by the modified Jolles technique can be done on the alcoholic extract already used for the purpose of estimating the Andrewes reaction. This factor is of considerable practical advantage in that it can be used as a check on the Andrewes test already carried out. It is especially helpful in those cases in which the result of the latter test is doubtful, on occasions when uncertainty arises owing to the extremely short duration of the red coloration or to the presence of some degree of hæmolysis. As mentioned above, the indican reaction is somewhat slower in development under these circumstances, which is rather a disadvantage, as already in the cases where the reaction is "+," the reading cannot be made till the next day. The new technique as described by us does not possess this disadvantage and, furthermore, the Andrewes test already carried out has no effect whatever on the degree or time of appearance of the blue colour. It has, of course, the further advantage that it is a potential quantitative estimation, but the final details of this aspect of the test are still under consideration.

The Clinical Significance of the Andrewes and Indican Reactions.

As pointed out above, the various tests that we have applied all form a means of determining the presence or absence of a fairly well marked degree of indicanæmia. As pointed out by Kishi[18] and Muto[19] among others the indican content of the blood is raised from other causes than renal disease, notably in gastro-intestinal disturbances and in inanition. The degree of elevation, however, is not so pronounced in these conditions as occurs with a nephritis and is too low to be detected by the techniques used by us, so that a positive finding would point to indicanæmia of renal origin. Kishi's studies in regard to experimental nephritis did not reveal very high indican values. No blood urea values, however, are given to provide information as to the degree of retention.

Quite a number of purely clinical studies of indicanæmia have appeared. Amongst the more recent is an extensive study by Baar,[20] who goes so far as to hold that the degree of indican retention provides the most accurate evidence of renal impairment, for whereas in health the kidneys are capable of dealing with all indican absorbed from the alimentary tract, the presence of renal disease leads to definite indicanæmia, sometimes with but little rise in the urea-retention. Krokiewicz,[21] also as the result of a fairly recent clinical study, came to the conclusion that the qualitative form of clinical test is one of the most simple and reliable tests in the prognosis and diagnosis of advanced renal insufficiency. On due consideration of our own findings we are inclined to hold the view that the determination of the degree of indicanæmia is at least as accurate a means as any other for estimation of renal efficiency, at all events if this is at all definitely impaired.

The tests described compare favourably with the widely used creatinine estimation and in their qualitative form are more simple to perform and afford ready means of obtaining accurate information within a short time, especially as they require a minimum of equipment. This latter consideration also should make these tests of especial value in places where laboratory equipment is not available. Furthermore, in *post mortem* investigations the indican test should be valuable in arriving at a diagnosis when this is in doubt and, as already pointed out by Blotner and Fitz in their work on the Andrewes reaction, should be of service in the differentiation of uræmic coma from coma of extra-renal origin.

As regards prognosis, the Andrewes reaction had been looked upon, till the work of Harrison and Bromfield was published, as a somewhat mysterious colour reaction, due to unknown constituents, in the presence of which the prognosis of the patient was practically hopeless. Without going so far as to repeat this statement, we would say that a positive reaction indicates a definite degree of indicanæmia which in turn is the result of advanced renal damage, with a prognosis correspondingly grave. It may be worth while to recall, however, that one of our dogs (dog Z) which at one time gave a "++" Andrewes and "+++" indican reaction, recovered

from the acute stage of the renal disorder and now has a fairly stable function with a blood urea of about sixty milligrammes and appears to be in moderately good condition, with no response to either the Andrewes or indican test.

Conclusions.

1. The response to the Andrewes test has been investigated in a large series of dogs suffering from experimental renal insufficiency due to various causes, namely, bilateral nephrectomy, ureteral transplantation and X ray nephritis.

2. The reaction affords valuable diagnostic and prognostic information in severe renal insufficiency.

3. It is definitely present after bilateral nephrectomy.

4. It is invariably associated with a definite degree of indicanæmia, to which the reaction is due.

5. Both the Andrewes and the indican reactions can be quickly estimated with a minimum of equipment.

6. A new and simple quantitative modification of the Jolles indican test is described which can be performed on material already used for the performance of the Andrewes test.

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SOME IMPRESSIONS OF OBSTETRICS ABROAD.[1]

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Attempts to characterize a foreign country are not always successful, particularly if the visitor has only a limited time at his disposal. Even when judgement is confined to a special subject which he considers himself capable of interpreting, the task is still not easy. However, my remarks are intended to be made more with the object of noting and comparing differences from our own methods than of criticizing in a carping spirit.

Sweden, Denmark and Holland.

Sweden, Denmark and Holland were visited to obtain first hand information of the conditions of obstetric practice in an attempt to ascertain, if possible, the reasons for the low maternal death rates obtaining therein.

As you are aware, most writers ascribe the low rates, especially in Sweden and Holland, as due to the majority of deliveries being conducted by highly trained obstetric nurses. From what I am about to describe it would appear that many of these authorities have been content to take their evidence second hand.

Sweden.

The University clinics at Stockholm and Lund were visited and one was struck by the modern equipment and the high standards attained at both centres. Sweden is a beautiful country, largely rural in type and populated by a strong, healthy race. As regards the women, contracted pelvis was a very rare complication, while eclampsia occurred on an average only once in each thousand births and was mild in type. In explanation of the larger number of cases seen in Australia, blame has been ascribed to the generous protein diet to which many are accustomed. However, the Swede is renowned not only for his appetite, but also for his table, so some other factor must be responsible. The incidence of venereal disease was low and interference during labour infrequent. Therefore, many

[1] Read at a meeting of the Victorian Branch of the British Medical Association on February 5, 1930.

of the principal causes of maternal mortality and morbidity were minimized or practically non-existent. The next factor in the problem concerned the period of training for students and nurses, in both instances a long and thoroughly practical course. As in all continental schools, students and nurses are trained in separate institutions and competition in the labour ward for cases, which is one of our difficulties, was absent and both groups benefit by the increased amount of practical material available. The medical student lives in an obstetric atmosphere for a continuous period of four months. On an average each personally delivers at least forty women and examines sixty gynæcological patients. A feature of the work is the excellent post-natal and post-operative follow-up of all patients. Nurses are trained for periods varying from eighteen months to two years at two centres for the whole of Sweden. Further description of this training will be made when dealing with Holland. As regards hospital accommodation there are only three private nursing homes, as we know them, in Sweden. In the smaller centres obstetric wards are attached to the general hospitals. For private patients there is a central bureau for sending out nurses. The proportion of women delivered in hospital varies from 50% to 60% and, contrary to what is usually stated, the majority of confinements are attended by medical practitioners.

In Sweden, therefore, the low maternal death rate is largely due to the absence of complications, to non-interference during labour and to the cooperation of highly trained doctors and nurses in suitable surroundings.

No account of a visit to Sweden would be complete without a cordial acknowledgement of my indebtedness to Professor Essen Möller, of Lund, a great obstetrician who, in the opinion of those qualified to judge, is the *doyen* of the art in Europe.

Denmark.

Conditions in Denmark largely resemble those in Sweden. The length of the medical curriculum is seven years, although the period of residence in a maternity hospital for students is only one month. The teaching units for students and nurses are side by side in the same building under separate professors. Denmark differs from her neighbours in requiring the student on graduation to spend one month in residence at a maternity hospital before he is licensed by the State board. The pregraduation course in obstetrics is mainly theoretical and the practical work is really done as a post-graduate subject. It was interesting to note that the qualifying examination in obstetrics was held in public, thus enabling the junior men to familiarize themselves both with the examiners and the way in which the examination was conducted.

Professor Gammeltoft, of Copenhagen, is in charge of a modern clinic and one noted his insistence on the value of post-natal examination of all patients before discharge from hospital. In the presence of students he laid emphasis on any conditions which had caused an unsatisfactory result to mother or child and discussed the steps to be taken to guard against a repetition in future pregnancies.

While this thorough review was of importance not only for clinical instruction, but also for the patient in revealing frequent latent conditions such as tuberculosis, it also prevented the work of the hospital from becoming purely routine. He also emphasized the need for adequate laboratory facilities. Clinical material was valuable only when it could be worked up in a critical fashion and by this means alone was it possible to determine whether any given line of treatment was preferable. We realize at the Women's Hospital our deficiencies in this respect and it is to be hoped that shortly a pathological department worthy of our teaching hospital will be built.

Holland.

While the conditions observed in Holland resembled in many respects those of the countries already mentioned, in others they were different and in any case were most interesting to the visitor.

The control of all public health activities in Amsterdam is vested in the municipal health department. The same applies to Rotterdam and the other larger cities and the State authorities are confined to duties more akin to those of our Federal department. The municipal health department controls all hospital beds in the city, there are 4,000 in Amsterdam, and doctors or patients must apply to the central office for admission thereto. There is a director in charge with deputy chiefs for each section, all full-time officials. Associated with them are approximately one hundred part-time practitioners and specialists. Normal patients are treated by general practitioners or nurses and if necessary specialists are consulted. As the university is maintained by the city and not the State, the services of the various professors are available for specialist opinion and the University wards are assured of adequate clinical material. Scattered through the city are sixteen dispensaries staffed mainly by part-time practitioners. These dispensaries house the following departments: a casualty room for minor accidents and surgery attended by a general practitioner in the neighbourhood, a medical out-patient department, a venereal diseases clinic, a dental centre, rooms for school medical inspection and an infant welfare centre at which antenatal advice is also given. I spent an afternoon at a baby clinic and was impressed by the way in which the work was done. All ill babies were referred to their own doctors or to a hospital. In their spare time the nurses visited the homes of the patients. The whole work was under medical direction. During the winter months lectures were given to the mothers, but attempts to deliver similar ones for fathers were unsuccessful. As elsewhere, the father is an elusive person where public health matters are concerned. Thorough antenatal supervision is insisted upon and the maintenance of breast feeding

is developed to a high degree. As Holland is supposed to be one of the countries where birth control is largely practised, it was interesting to note that officially it was not taught owing to religious difficulties. However, an inspection of many shop windows showed that possibly any official advice was superfluous.

As regards the complications of pregnancy, eclampsia was apparently more prevalent than in Sweden and Denmark, but the majority of attacks were mild. The type so frequently seen in Melbourne was unknown to the Dutch. Mild degrees of rhachitic contracted pelvis were also prevalent. The number of Cæsarean sections performed was greater than at the Women's Hospital here, but this was partly due to its more frequent use for *placenta prævia*.

It was instructive to note that in the curriculum for students obstetrics was allotted a period equal to that for surgery. The practical course comprised four months' residence in hospital, during which a very thorough course of instruction was given by Professor Van Rooy and his staff.

Nurses undergo a three years' course at one of two training schools. After a competitive examination forty trainees are admitted to each school. In the first year the instruction is almost entirely theoretical, while three hours weekly for the three years are devoted to Swedish gymnastics, thus insuring good health, a factor frequently lacking in our shorter course. The practical work in the first year is confined to domestic assistance in the puerperal wards. In the second year practical work in the labour ward commences with continuance of the theoretical instruction. The last year is spent in work outside the hospital together with attendance at classes of hygiene and infant welfare. The trainees attend women in labour under the supervision of the municipal midwives, gaining practical knowledge of the difficulties of domestic practice and in addition the senior trainees act as *locum tenentes* for midwives in the country, enabling the latter to return to the training school for post-graduate refresher courses. A certain number of women take a short course of one year and become assistant midwives who are permitted to attend puerperal patients only.

There are sixteen communal midwives for the delivery of the poor of Amsterdam. These are paid by the municipality a maximum salary of £300 with three weeks' holiday annually. The majority of patients, however, belong to lodges and engage private midwives who are paid by the lodge on an average of twenty-five shillings to two pounds per confinement. Assistant midwives undertake the after care. Doctors' fees vary from four to twenty-five pounds for specialists.

As Holland has been extensively quoted as an example of a country where deliveries are almost exclusively conducted by midwives, it will be of interest to hear what Miss S. Buvig, Mistress-Midwife of the Amsterdam Training School, has to say in a written statement of the position.

The time is long past when all labours were attended by midwives, though that is still the case in a few country places. As a rule the midwife attends the poorer people and the doctor those in the more well-to-do classes. Nevertheless, up to a few years ago, about 75% of the births were attended by midwives. Our country now has enough doctors for them to begin to compete with the midwives, so that in recent years fewer and fewer labours have been attended by the latter. The statistics show that during last year this number had fallen to about 60% of the whole.

Summarizing the conditions noted in Scandinavia and Holland the low rate of maternal mortality can be attributed first to the comparative absence of many of the complications of labour met with elsewhere, secondly to the very thorough education of students and nurses and thirdly to a minimum of interference coupled with the use of good hospitals especially for abnormalities.

The trained nurse has an assured position in all these countries and any attempts at nursing by unregistered persons are rigorously suppressed. This is in great contrast to Victorian conditions where despite the *Midwives Act* the qualified nurse gets scant legal support when prosecutions are launched by the Board.

From personal observations and after conversations with the authorities in Holland I am dubious of the correctness of their statistics, especially those of puerperal sepsis. The standard of classification appears to be different from that in use here. To Professor Essen Möller, Professor Gammeltoft and Professor Van Rooy I am under a deep debt of gratitude for the personal interest shown to a stranger and for the way in which every facility was granted me to see the work of the clinics and also for detailed explanations of the general situation in their respective countries. The health authorities were also most courteous and helpful in every way. These countries will well repay a visit and the traveller can be assured of a warm welcome from hosts who are as fluent in English as themselves.

Austria, Germany and Switzerland.

Post-graduate facilities are particularly good in Vienna which seems to have regained its pre-war reputation in this respect. Except for special work the German clinics are not visited by many English-speaking graduates. Despite tales of poverty I was struck by the lavish equipment of the leading centres, especially as regards radiological apparatus. It is significant that the most modern obstetrical hospitals erected in Europe since the war can be seen in Vienna and Leipzig. In most clinics Cæsarean section is advocated to a greater extent than with us. The dissatisfaction with current rates of maternal mortality which is so current in Anglo-Saxon countries, does not seem to affect the German whose own rate is by no means a low one.

Switzerland possesses two fine clinics at Zurich and Geneva and at the latter I was fortunate to obtain some ingenious apparatus for teaching.

Great Britain.

A close inspection of the main teaching centres leaves the impression that the leading obstetric schools are Glasgow, Manchester and University

College, London. Owing to certain factors Glasgow has not yet become the post-graduate obstetric centre of the world, a position it should hold by reason of the wealth of clinical material at its disposal. Professor Hendry has elaborated a course of instruction for students which promises to be the standard one in Britain. The work in Manchester of Dougal and Fletcher Shaw, especially in gynæcology, was noteworthy. At University College Hospital Professor F. J. Browne is in charge of a unit where the opportunities for post-graduate research are second to none and the visitor is made to feel very much at home. Dublin still maintains its reputation as a clinical centre, but the political changes of recent years have not assisted post-graduate work.

The object of this paper, however, is not to describe technical details, but to touch on certain general aspects of interest in obstetrics. Just as Holland has been quoted as an example to follow, so the remarkable figures of the East End Lying-In Hospital have received wide publicity.

Special Hospitals.

The East End Lying-In Hospital of fifty-six beds consists of several houses in a terrace with the adjoining walls removed. The result is a conglomeration of winding passages with floors on different levels forming a series of semi-isolated rooms each with its own labour ward. The well known results of this institution, since its inception 49,567 intern and extern patients have been delivered with 66 deaths, a mortality of 1·33 per 1,000 births, are really a tribute to close cooperation between the nurses and the honorary medical officer. All patients receive antenatal care from the trainees under the supervision of a senior sister who reports any abnormalities to Dr. Oxley. Unless patients attend regularly, they are not admitted to the hospital. Few complications are encountered. Contracted pelvis is not common and only one case of eclampsia has occurred in the last 10,000 deliveries. Patients suffering from abortions are not admitted nor women on whom attempts at delivery have been made outside. The simplest methods are taught and there is no elaborate equipment. According to the matron the low forceps rate (3%) is explained by the absence of a resident medical officer! I was impressed by the fine air of optimism which is due principally to the Scotch matron whose influence on patients and relatives is a great psychological factor in the results.

Conditions prevailing at this hospital cannot be taken as representative of obstetric practice in general, but they do point to what can be attained by thorough antenatal care and cooperation between doctor and nurse during labour.

Dr. Remington Hobbs was kind enough to devote a morning to show me his results at Saint Mary Abbott Hospital with the intrauterine injection of glycerin in the treatment of puerperal septic conditions. It might be mentioned at this stage that in all the centres visited the treatment of puerperal sepsis resolved itself into a minimum of interference, fresh air, good food and a plentiful use of stimulants. Serum and chemotherapy had proved valueless.

Remington Hobbs is an enthusiast for the use of glycerin. During labour he injects it for retained placenta, *post partum* hæmorrhage and as a prophylactic after any operative interference when sepsis is feared. In the puerperium he advocates it for red lochia, for after pains and when pyrexia occurs. Finally it is of value for chronic affections in patients with a previous obstetric history, suffering from pain and discharge. This method of treatment is at present being investigated on a large scale by the Maternal Mortality Committee throughout Great Britain. From some remarks I heard the results did not bear out all that is claimed for the method by Hobbs.

Obstetric Practice in General.

The British profession is playing an important part in the investigation of maternal mortality and the attempts to improve the practice of obstetrics throughout the Kingdom. I need only refer you to the scheme for a national maternity service presented at the last annual meeting of the British Medical Association. Another important and contentious report from Aberdeen definitely stated that the mortality in hospitals was very high compared with private practice, while, similarly, midwives had a lower rate than doctors. The result of these reports has been a plea for a service in which the doctor provides the antenatal work and deals with any emergencies, while normal labour is to be left to the nurse. The basic objection to this is that automatically as experience in normal obstetrics is withdrawn from the general practitioner, his ability to cope with complications will diminish. An intimate knowledge of the processes of normal labour can be acquired and maintained only by constant practice and this must form the main requisite in dealing with any emergencies. The proposed scheme will prove attractive to the administrator and cannot be ignored by the profession not only in Great Britain, but elsewhere. As Eden aptly puts it: "Are we to agree that partly trained women are more successful in the management of labour than fully trained medical men?"

Antenatal supervision is making rapid progress in Great Britain. The Ministry of Health has a maternal mortality committee composed of departmental and British Medical Association members and much good work is being done by this body. A detailed investigation of maternal deaths is in progress and valuable information has already been collected, although some time must elapse before definite conclusions can be published. Both departmental officials and representatives of the profession informed me that this inquiry was being supported whole-heartedly by the general practitioners.

Another movement to raise the status of obstetrics and to assist in efforts to improve the training of students and graduates is the formation of a British college of obstetrics and gynæcology. It can be

readily seen, therefore, that the whole position in Great Britain is the subject of earnest thought and that the medical profession is leading the way to reform.

America.

In my limited time a few general impressions after a hurried visit to the main centres in Canada and the United States only can be attempted. The first feature which strikes the stranger, is that practically all the hospitals are built and maintained by private funds and contributions. They seem to find no difficulty in persuading a wealthy man or a religious body to endow a hospital. The main object of such a backer is to meet the annual deficits from which even American hospitals built on a community plan are not immune. Once the financial means have been secured, there seems to be no limit as regards plans and equipment. Most of the hospitals visited were distinguished for their spaciousness and luxurious equipment not only for patients of all grades, but also for the nurses' quarters. A particularly striking feature was the large entrance hall and waiting room furnished like the lounge of a first class hotel. Every attempt was made to get away from a cold hospital atmosphere. In many places different departments were united in the same building, the classic example being the huge medical centre in New York. On the other hand, several capable administrators preferred separate buildings for each unit, but all close together; Montreal and Cleveland were good examples of this. Compared with our standards the size of the hospital staffs was astonishing. Not only were doctors and nurses proportionally more numerous, but the administrative staff of typists and clerks seemed enormous. Probably as a result of the organizing frame of mind of the American all hospital activities were developed to the highest possible degree. This is especially seen in the keeping of records, the follow-up system and the social service department. The records room of Johns Hopkins Hospital, for example, contained thirty-one clerks, while the Women's Hospital in New York kept five typists hard at work all day. One is astounded at the apparent efficiency of all this and also by what it must cost. However, one comes away with the feeling that here and there it was somewhat overdone and in fact several breakdowns were noted. Although it may not be quite so convenient for the medical staff, especially for those seeking statistical information, it is comforting to know that for those of us in less affluent circumstances the results as far as the patient is concerned can be attained in simpler ways.

The educational number of *The British Medical Journal* of last year contains an article by Sir Norman Walker on medical education in the United States which will repay reading. Owing to the pre-medical requirements the average age of the students is greater than with us, but the actual educational attainments of the general run of freshmen appears often to be below our standards. Latin is not compulsory, a knowledge of modern languages is frequently sketchy, while the general standard of English is low. This criticism does not apply to the leading schools, but to several others which were visited. Most schools restrict the numbers entering each year and the "chronic" is not tolerated.

The teaching of obstetrics in America affords a striking contrast to what occurs in Europe. On the Continent both obstetrics and gynæcology are united in one chair with the professor absolute head of the department. Conditions in Great Britain vary. In some instances the professor is merely one of the staff of the teaching hospital and as actually happens at Glasgow may not even have continuous service throughout the year. In America only a few of the universities combine both subjects under one man, but these comprise the cream of the schools. Hospital accommodation is arranged accordingly. For example, in Montreal where the subjects are combined, there is a separate obstetric hospital connected by passages with the general hospital. In New York, on the other hand, at the medical centre these subjects form a special department under one man and occupy three floors of the building. At Chicago there is a large obstetric hospital, but gynæcology is mainly taught at separate institutions by other men. Johns Hopkins Hospital has separate departments in the same building, while at Cleveland and St. Louis, probably the best centres in the States, they are housed in adjacent buildings. In both of these schools, although gynæcology is taught by a separate professor, the professor of obstetrics is the head of the department. The tendency among the leaders of the profession is to regard any division as unnatural and to insist on the unity of the subject with obstetrics playing the predominant rôle.

The theoretical teaching of obstetrics is good, particular attention being paid to pathological demonstrations. Extensive use is made of moving pictures and each clinic has its own set of films dealing with details of operative procedure. While in Chicago I was able to hear the first "talkie" obstetric film presented by De Lee who illustrated his lower segment Cæsarean section operation under local anæsthesia.

In many centres the amount of practical work seemed inadequate. Often only six to twelve women were delivered by the student during his course. One must also recognize that completion of the academic course does not lead to immediate private practice and that owing to the requirements of the State licensing boards the majority of graduates proceed to a period of internship when opportunities of obtaining more practical work are available. At Johns Hopkins Hospital the idea seems to be that as many students will not practice obstetrics later, therefore, there was no need to teach the whole class in an intensive manner. For those who desired it, there were optional or elective classes in the final year. There is, however, no guarantee that the graduate may not change his mind later and

his only training may have been the course in the junior year when he lived in the hospital for one week and attended six women in labour.

The splendidly equipped wards for babies are a striking feature of all American hospitals. Visitors are never admitted and a separate staff cares for the infants and takes them to their mothers at feeding time. All attendants in the nurseries wear gowns and masks. The large percentage of artificial and supplementary feeding was also very noticeable. I was not impressed by the universal custom of handing the infant over to the specialist in pædiatrics immediately after birth. I still think that the obstetrician should maintain control while the mother is in hospital, naturally seeking the cooperation of the pædiatrician when in difficulties.

Although in some centres, notably Montreal, New York and Baltimore, conservative methods are practised, I cannot but note with concern that surgical methods of delivery are more popular both with doctors and patients. Potter, of version fame, is a man of charming personality, slow and deliberate in his manipulations, but even in his hands the fœtal mortality following this procedure for normal labour is not negligible; the use of a deep episiotomy and the application of forceps early in the second stage of labour by De Lee appear to yield good results. But the same cannot be said of the host of their imitators who do not possess their technical skill. Confidence in the powers of Nature is not a strong point in the armamentarium of the average American obstetrician.

A very high standard was observed in all the gynæcological clinics. I was struck by the quiet, deliberate methods of procedure and the care taken in preoperative preparation, narcosis and the gentle handling of tissues. The cordial and friendly relationship of chief and assistants and the absence of noise and recrimination in the operating theatres were also noticeable.

Weekly or fortnightly staff meeting are a feature of all clinics. Some left the impression of careful staging after much preliminary work, but the great majority were most helpful and a valuable check on the current work of the department.

Americans do not like their poor showing regarding maternal mortality and efforts to reduce this reveal many problems more difficult than those with which we have to contend. The coloured population, with its greater incidence of venereal disease and contracted pelvis as well as an increased liability to sepsis and an aversion to antenatal supervision, tends to keep the average rate very high. The large proportion of eastern European immigrants present many problems before they are assimilated. Many of them have difficult deliveries due to pelvic deformities not met with in the Anglo-Saxon. The poor training of so many of the older practitioners and of the graduates of the low grade schools coupled with the amount of operative delivery presents another problem. However, the persistent work of the American College of Surgeons and of the leaders of the profession is gradually being felt. A strong committee appointed by President Hoover is quietly investigating and from conversations with the chairman I am convinced that they are working along the right lines. It is pleasing to know that the work already done in Australia and New Zealand has been noted with approval and envy.

One aspect of the problem relates to the quality of the nursing services. In America, although three months' training in obstetrics is part of the regular course of every nurse, she only observes patients in the labour ward and never delivers them. There are no trained obstetric nurses as we know them, except those who have been abroad for their course. This applies particularly to the Kentucky Frontier Nursing Service, analagous to our bush nurses, who send their nurses to Scotland for the course familiar to us all out here. B. P. Watson, of New York, is taking this matter in hand and is leading a campaign in favour of such a change.

It is not easy to epitomize my impressions of America after a too short visit. While there are apparent unlimited resources of wealth and also a lavish expenditure on non-essentials, we must also remember the power of organization coupled with enthusiasm and high idealism which characterizes particularly the leaders of the profession. They fully realize many of the shortcomings and are determined to rectify them. I must also acknowledge with gratitude the friendliness and almost embarrassing hospitality accorded to me throughout Canada and the United States. One of the discoveries of the trip was how much we had in common despite the attitude of a section of the press.

Finally, the main object of this paper has been not to go into technical details, but rather to attempt to show you something of the problems in other lands and in particular to draw attention to the leaven of dissatisfaction with the present state of affairs in obstetrical matters which is working in many countries, more especially in those speaking our mother tongue.

THOUGHTS ON CÆSAREAN SECTION.

By Herbert Throsby, M.B. (Sydney),
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It is unquestionable that Cæsarean section at the present time is very often performed by specialists, obstetricians and general practitioners. Personally I think it is often performed unnecessarily and without due regard to future conditions both of the mother and of the child.

In this paper, however, the indications for and against the operation will not be discussed. The operation of Cæsarean section is a comparatively easy procedure and is thus tempting to specialists and general practitioners and is often a short cut to absence of anxiety and loss of time and worry.

To the public it is a dramatic operation and one fears that it is often performed on this account

to gain *kudos* and fame for the surgeon. But, whether justifiable or not, Cæsarean section will continue to be done with increasing frequency, both because of the comparative safety of the operation and also because many women have a dread of childbirth and if promised immunity from labour pains, will willingly consent to operation.

For these and many other reasons it is important to consider not only the safety of mother and child, but also to remember what the after results of the operation may be. Among the after results several should be considered.

Weakness of Uterine Scar and Possible Rupture in any Future Pregnancies.

The rupture of a scar from a previous Cæsarean section is not a very uncommon occurrence and there are many different opinions among obstetricians as to its cause. Some authorities blame the method of suturing, some the suture material and others the necessity of having to suture muscle which contracts in two planes, that is, the circular and longitudinal fibres of the uterine muscle. Probably a combination of all these factors is the reason why a yielding scar is common in the puerperal uterus.

In regard to the method of suturing two important points seem to need consideration. The use of mattress stitches in the uterine muscle would seem to be contraindicated principally because of their tendency to strangulate tissue and, though an efficient means of obtaining hæmostasis, would seem to cause degeneration of muscle fibres by pressure and consequent weakening of the subsequent scar. The second point is that perforation of the mucous membrane of the uterus by needle and suture should be avoided, especially if such material as chromicized gut be used, as, if the interior of the uterus is septic, such sepsis may be carried to the uterine wall by the suture which would possibly act as a seton. It would seem that the best method of application of the first layer of sutures would be a continuous suture of plain gut by which the needle took up a small part of the muscle immediately subjacent to the mucous membrane without perforating the latter and so causing inversion of the mucous membrane, a condition so necessary in the suture of any hollow viscus.

The next point is the kind of suture material used. In the past various suture materials have been recommended, mostly of the non-absorbable variety and even today there seems to be no unanimity in regard to this. Berkeley and Bonney recommend silk for all layers. Silk is still used extensively at Chelsea Hospital for many purposes, probably owing to the influence of these great authorities, but to many of us here in Australia this practice is unusual and perhaps unsavoury. How many of us have removed buried silk suture from abdominal walls and elsewhere, placed there by English surgeons months and even years before? To bury silk seems an unnecessary risk to take in clean classical Cæsarean sections, while if sepsis be suspected, it would seem to be the very worst possible suture material. The use of buried silkworm gut has the same objections.

We have then left only two suture materials in common use, chromicized and plain catgut. Professor Munro Kerr, of Glasgow, uses chromicized gut for all layers, but as he practises the lower segment Cæsarean operation almost exclusively, the question of the kind of suture material is not so important as in the classical operation. Professor Beckwith Whitehouse, of Birmingham, uses plain catgut for all layers in the classical operation and I think the same practice is common in Germany and America. Probably a combination of chromicized gut and plain catgut is the most satisfactory, plain gut for the deeper muscular layer, interrupted chromicized gut, not to include the peritoneal layer, for the bulk of the uterine wall and plain gut for the superficial muscle and peritoneum.

Munro Kerr and Hendry have pointed out the difficulty of suturing the puerperal uterine wall in the classical operation. This difficulty of suturing in order to obtain accurate approximation is one of their objections to the classical Cæsarean section and is due to several factors. First the implantation of the placenta on the anterior wall of the uterus occurs in 40% of all pregnant women and it is well recognized that the uterine muscle in this situation is soft and friable and consequently very difficult to suture. Another factor and probably the most important is that the uterine wall consists of two types of musculature, the longitudinal and the circular fibres, which when the uterus is emptied and particularly during the puerperium, contract in different directions. This irregular contraction makes for bad apposition of cut sufaces; blood clot collects between the surfaces and in turn subsequently becomes fibrous tissue and very little true union occurs between the muscle fibres. Hence a weak and yielding scar often results. Still another factor in suturing the uterine wall is the liability of mucous membrane to be included between the muscle walls and as Kerr, Hendry and MacIntyre have pointed out, a gutter is thus formed on the internal surface of the uterine wound and in consequence a thin scar is formed.

It may be of importance to mention in this place that a fully curved, rather large, round-bodied needle is much preferable to a cutting needle, as less hæmorrhage is encountered by using the former variety and less likelihood of wounding veins and sinuses.

As will be subsequently mentioned, the best approximation of cut uterine surfaces occurs in patients anæsthetized by spinal methods.

Since Cæsarean section will probably be done in future on increasing numbers of patients, it behoves all obstetricians to decide the class of case most suitable for section, the best technique by which to deliver a living and uninjured child and also one giving the best results as regards the recovery

and subsequent good health of the mother. This latter should also include her capability or otherwise of her having other children.

The choice of the class of case most suitable for section is a large question and will not be fully discussed in this paper. Fortunately for Australian native born mothers, high degrees of pelvic deformity are rare in this country and are not seen nearly so often as in such cities as Glasgow or the midland towns of England. Still those of us who have had many years of general practice, especially in the cities, occasionally have seen women with obviously deformed pelves on whom no operation short of Cæsarean section would be considered. Not much difference of opinion is likely to arise in these circumstances, except as to whether the classical or lower segment operation should be performed and whether sterilization should be carried out at the time of section. These are considerations which depend a great deal on the views of the obstetrician and also on the social condition of the patient.

The selection of the best technique for mother and child also seems to depend largely on the nature of the obstetrical difficulty and no strict operative law can be laid down for all exigencies. There seems at the present time to be a tendency in several countries to favour the low segment operation following the teachings of Kerr and Hendry in Great Britain and Sangster and others in Germany. In America also there seems to have been an enthusiastic wave of opinion in favour of the low operation, though in a recent paper[1] Piper and Bachman have many criticisms of it in the routine practice of an obstetric hospital. The authors evidently had trouble at times in the delivery of the head which was moulded into the pelvis after many hours of labour. Also in the presence of sacculation of the uterus due to previously performed interposition operation there was great difficulty in the delivery of the head. Kerr and Hendry have pointed out that patients with these conditions are particularly unsuitable for low segment section and as Piper and Bachman admit an error of judgement in doing a low segment section in these circumstances, their adverse criticism seems of no account.[1]

During a recent visit to Europe I found in England that the classical or corporeal incision was still in favour, but the Glasgow school believes in the low segment section, while in Vienna I was told that the classical operation had almost disappeared in favour of the lower segment incision.

Probably, as is generally the case, the truth lies between the two schools of thought. In other words, certain patients are best treated by the classical method and others by the lower segment operation; this should be our attitude today. Undoubtedly the lower segment operation has many distinct advantages, as I hope to show later; perhaps this operation is performed too seldom in suitable cases in Australia today.

The Classical or Corporeal Operation.

Classical Cæsarean section, as everyone knows, is a very old operation and has been practised throughout the ages. The modern method of its performance is so well known that a full description here would be superfluous. However, there are still controversial points in the operation, notably the kind of suture material to be used and the method of suturing which have already been discussed earlier in this paper. In this connexion it was my good fortune last year to see Professor Beckwith Whitehouse, of Birmingham, perform Cæsarean section three times by the classical method, but he used spinal anæsthesia instead of inhalation narcosis. Whitehouse and Featherstone have done original work both on the innervation of the uterus[2] and on Cæsarean section under spinal anæsthesia.[3]

The operations I saw were remarkable for the smoothness of technique and the calmness of the patient, but what was most striking was the absence or almost complete absence of hæmorrhage from the cut uterine wall. Most remarkable of all was the good contraction of the uterus and the easy approximation of the uterine wound. The good general condition of the patients during and after operation was also most noticeable. These operations were performed for generally contracted pelvis, chronic nephritis and advanced heart disease. Dr. Featherstone induced the spinal anæsthesia with "Tropococaine" (1·5 cubic centimetres of 5% in saline solution). The space between second and third lumbar vertebræ was chosen and ten cubic centimetres of cerebro-spinal fluid were allowed to escape before the "Tropococaine" was injected. The anæsthesia seemed perfect and one patient talked cheerfully throughout the operation.

Professor Whitehouse states that three points of interest call for special mention in Cæsarean section done by spinal anæsthesia.

The Condition of the Child.

The condition of the child is usually better than when the operation is performed under ether narcosis.

The Tone of the Uterus.

The tone of the uterus is greatly increased and the contraction is vigorous.

Bloodlessness.

The comparative bloodlessness of the operation due to increased tone of the uterus might be a very important consideration in patients who have suffered a heavy loss of blood from conditions such as *placenta prævia*.

Before leaving the subject of recent work on the classical operation I cannot help referring to the remarkabls series of operations reported by Dr. Frances Ivens, of Liverpool.[4] She gives results of 295 operations with a mortality of 1·3%. As the patients were quite unselected and included those regarded as "suspect," those suffering from accidental hæmorrhage, eclampsia, obstruction by

tumours, as well as cardiac and pulmonary disease, the results have been remarkably good. Dr. Ivens's technique differs a good deal from the usual practice and I cannot help thinking that her excellent results have been due to this, especially in patients suspected of sepsis. She is evidently particularly careful that the peritoneum is efficiently shut off by gauze sponges and also that an extra assistant keeps up pressure on the abdominal wall against the fundus when the uterus is opened, and helps to push the uterus out of the wound immediately the child is extracted. Another innovation is drainage by a rubber tube of the cave of Retzius when there is suspicion of septic infection. Dr. Ivens does not mention a separate incision through the peritoneum for this manœuvre, though in the classical operation this would seem to be necessary as the uterine incision in the classical operation is well above the bladder. She points out that the classical operation is easier to perform and therefore it should be preferred by the rank and file of operators. By adopting her technique the classical operation should be made a safer measure for patients suspected of septic infection than it usually is.

The Lower Uterine Segment Operation.

The lower uterine segment operation was first suggested by Frank in 1907 and was subsequently modified by Krönig. Amongst its strongest advocates in Great Britain have been Munro Kerr and Hendry, of Glasgow, and an excellent description of the operation is given by them.[5] In conversation with Professor Kerr last year I gathered that he is still enthusiastic about the advantages of the lower uterine segment operation and that he thinks that it should be performed oftener than it is. A very important modification introduced by Kerr is the adoption of a transverse or slightly curved incision in the lower uterine wall instead of the vertical incision used by the German obstetricians. The advantage of the transverse incision, according to Kerr, is that there is no danger of the wound in the uterus extending upwards into the actively contractile part of the organ as might occur if the child were extracted through a vertical incision. The bladder also in the lower part of a vertical incision might be injured, as has happened on several occasions.

The following short description of the lower segment operation is mainly taken from Kerr and Hendry's paper.

The preparation of the patient is similar to that for any abdominal operation. It is most important that the bladder be emptied by catheter just before the operation.

The Trendelenburg position is used and a half of a cubic centimetre of pituitrin is injected intramuscularly at the time of the incision of the skin. A longitudinal incision is made about fifteen centimetres (six inches) long below the umbilicus and extending to the *symphysis pubis*. The lower end of the wound is then retracted over a layer of gauze with a Doyen's retractor and the rest of the abdominal cavity is protected by packing off the upper portion of the operation area with gauze. The loose peritoneal covering of the uterus, about half way down the lower uterine segment, is then picked up and incised transversely and separated with the fingers on both the upper and the lower sides of the incision. A slightly curved incision with the convexity downwards is then made transversely through the uterine tissue. In order that the extremities of this uterine incision should not be torn when the child is extracted and the uterine vessels at the side of the lower uterine segment injured, two short catgut stitches should be passed with a curved round-bodied needle through the uterine wall at either end of the incision and the ends of the sutures held in artery forceps. The centre of the uterine incision should also be marked on the upper and lower edge by a slight cut with knife or scissors. This mark helps to approximate the cut surfaces accurately in the subsequent suturing. As soon as the centre of the incision is completed and the scalp of the child identified, the incision is completed by a blunt-pointed bistoury or blunt scissors to the full length. The fundus is pressed on by the assistant in order to make the head prominent and one blade of a pair of obstetric forceps is slipped under the head to act as a guide; a very little manipulation usually suffices to deliver the head. Sometimes two blades of the forceps may be necessary to guide the head through the incision. Kerr and Hendry emphasize the point that the forceps should be used as a guide and not as a tractor and that the delivery of the head should be completed by pressure on the fundus. The use of the forceps at this stage also prevents to some extent the soiling of the gloves and tissues with presumably septic material. The umbilical cord is ligatured and divided in the usual way. A self-retaining retractor is now inserted to keep the sides of the abdominal wound apart. If the cervix is not well dilated, the placenta is delivered through the uterine incision by pressure on the abdominal wall and also by traction on the cord. An intramuscular injection of ergot is now given. If the cervix is known to be well dilated and this is a most important advantage in an infected patient, the placental end of the cord is dropped back into the uterus and the placenta and membranes are expressed *per vias naturales* when the abdomen has been closed. By this measure intrauterine manipulations are reduced to a minimum. The two temporary catgut sutures at the ends of the wound are now drawn in opposite directions by the assistant in order to facilitate the suture of the uterine wound. The mucous membrane, together with innermost layer of muscle coat, is sutured with continuous number 1 chromicized gut, the edges of mucous membrane being directed inwards towards the uterine cavity. The remainder of the muscle coat is carefully approximated and sutured with a continuous number 2 or 3 chromicized gut suture. Great care must be taken to secure completely the lateral extremities of the incision. Lastly, the peritoneum

over the incision is closed with a fine catgut continuous suture. The gauze packing is removed and the abdomen closed in layers.

If I presumed to criticize such great authorities as Kerr and Hendry, I should question the use of chromicized gut in the uterine wall, especially in patients suspected to be or actually infected; the suture and puncture of the mucous membrane in such circumstances might act as a seton carrying sepsis to the uterine wall. It might be better to use plain catgut for all layers. After the extraction of the child and placenta, it might be advantageous to change one's gloves in order to avoid as far as possible infection of the uterine and abdominal wall.

The authors claim that in repeated operations the scar has proved to be sound in all patients except one in whom definite thinning at one end was noticed. In the majority no trace of a scar could be found.

Among other advantages of this operation Kerr and Hendry point out that post-operative adhesions are seldom found, while in the classical operation they often form a very considerable operative difficulty when a second Cæsarean section becomes necessary.

The authors give a short summary of results in 107 cases.

Infection.	Number of Patients operated on.	Number of Deaths.	Mortality.
Uninfected ..	82	0	0%
Doubtful . ..	25	4	16%

The uninfected are those in whom all preoperative vaginal examinations were carried out in hospital; the doubtful included all the others. The interference in the latter series varied from the previous unsuccessful application of forceps under domestic conditions to unsupervised vaginal examinations by nurses or midwives.

It seems advisable now to consider the advantages and disadvantages of these two methods of performing Cæsarean section and their practical bearing on practice by obstetricians and general practitioners. It must be remembered that the general practitioner is often more concerned with patients requiring Cæsarean section than the specialist and the operation may have to be performed in country districts where skilled help and nursing are difficult or impossible to obtain. Both operations are comparatively easy to perform and the practitioner's principal concern is to decide what form of operation to carry out for certain conditions and under certain circumstances. That there is a distinct advantage in performing the lower segment operation for suitable conditions cannot be denied. Professor Kerr believes that it has saved many lives, especially when sepsis is definitely present or is suspected. It also has the great advantage that should a subsequent pregnancy take place, the uterine scar is more likely to be a firm one. From a small personal experience of this operation I can state that it is easily performed, though perhaps not so easily as the classical and that it is usually better to wait until labour has commenced before doing it, so as to insure that the lower segment is thinned and the head prominent. On this account the operation has been somewhat adversely criticized, as it should not be performed unless labour has commenced and therefore to wait for labour before operating may cause inconvenience to the operator. Kerr points out that this should not influence the operator and further states that deliberate Cæsarean section (section performed before labour) often produces premature infants. Still another point in waiting for a trial labour is that in the presence of border-line contracted pelvis the head may mould in a better manner than was expected and so pass through the pelvis without interference.

It is now necessary to consider whether we in Australia are correct in mostly performing the classical operation. Without doubt the classical operation is generally performed in this country. There is statistical evidence that the lower segment operation is one that is eminently suitable for patients in whom sepsis is suspected, that is in women who have had frequent vaginal examinations and attempts at forceps extractions. In such circumstances the probability of a septic peritonitis is very great and any technique designed to lessen the soiling of the peritoneum by the septic contents of the uterus must be a great advantage to the patient and must diminish the incidence of peritonitis which is so often a fatal termination. The lower segment operation seems to be particularly fitted for those patients who desire subsequent pregnancies. There can be no doubt that on anatomical grounds alone the transverse incision of Kerr and Hendry would imply a much better subsequent scar than that left by an incision through the body of the uterus and therefore there would be much less risk of a rupture in a subsequent pregnancy. When sterilization of the patient is necessary, the somewhat easier classical operation, except in the presence of suspicion of sepsis, might be done, because the subsequent fate of the uterine scar would not be an important consideration.

It has been stated by certain obstetricians that the lower segment operation is unsuitable for patients with *placenta prævia*. This, according to Kerr, is not so; he points out, as has been mentioned before, that in 40% of normal pregnancies the placenta occurs on the anterior wall of the uterus and in consequence must somewhat complicate the classical incision. Yet this fact has not been instanced as a contraindication to the classical operation. Kerr mentions in his paper that great difficulty may be met in the lower segment operation in delivering the head should the pelvic outlet be contracted, because the head is deep in the pelvis and is also very much moulded to the bony walls. Such conditions would seem to be unsuitable for lower Cæsarean section.

What considerations, then, should guide us in studying cases suitable for Cæsarean section? The following conclusions seem justified on the recent work done on the subject.

1. The great majority of patients suspected of septic infection should be operated upon by the lower segment operation. The exceptions to this are: (*a*) contracted outlet with the head deep in the pelvis, (*b*) when the operator is unfamiliar with abdominal work and skilled assistance is not at hand. In such latter circumstances the classical operation with Ivens's technique which has already been described, should be adopted.

2. In many patients with advanced heart or kidney disease, in *ante partum* hæmorrhage or in any cicumstances in which inhalation narcosis is contraindicated, the spinal anæsthesia of Whitehouse and Featherstone should be seriously considered. It is also questionable whether spinal anæsthesia should not be adopted, apart from kidney and heart disease, in many other patients for whom Cæsarean section is indicated. One great advantage of this method is the better coaptation of the uterine wall and lessened hæmorrhage. This method, however, has not been yet tried sufficiently often to justify its use as a routine procedure.

3. The suture material for the uterine wall should be absorbable and preferably should be of both chromicized and plain gut, though when there is undoubted septic infection plain gut is preferable.

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(1) E. B. Piper and C. Bachman: "Corporeal and Cervical Cæsarean Section," *Surgery, Gynecology and Obstetrics*, October, 1929, page 547.

(2) B. Whitehouse and H. Featherstone: "Certain Observations on the Innervation of the Uterus," *The Journal of Obstetrics and Gynæcology of the British Empire*, Winter, 1923, page 565.

(3) B. Whitehouse and H. Featherstone: "A Note on Two Cases of Cæsarean Section under Spinal Anæsthesia with Tropococaine," *The Proceedings of the Royal Society of Medicine*, February, 1923, page 55.

(4) F. Ivens: "The Scope of Cæsarean Section," *The British Medical Journal*, December 29, 1928, page 1166.

(5) J. M. Munro Kerr and J. Hendry: "Conservative Cæsarean Section by the Lower Uterine Segment Incision," *Surgery, Gynecology and Obstetrics*, July, 1926, page 85.

Reviews.

SURGICAL DISEASES OF THE THYREOID GLAND.

"Surgical Diseases of the Thyroid Gland," by Eberts, is an admirable monograph embodying the views of the Goître Clinic of the Montreal General Hospital and can be strongly recommended to all interested in the surgery of goître.[1] Dr. Eberts has produced a book incorporating in a remarkably small space a large amount of information which makes all the more appeal because it is a record of personal experiences, observations and reflections, freed from the leading strings of authority.

The theories of causation of endemic goître are reviewed and the belief is indicated that the causation may be multiple and varied and not necessarily the same in different territories. With this view we entirely agree. Due credit is given to the prevention of colloid goître by iodine and the directions for its treatment are excellent, though experiences may vary regarding the efficacy of such treatment.

Dr. Eberts makes a heavy arraignment of adenomatous goître and advises universal operation because 25% will become toxic and because of the possible developments of pressure on the trachea, hæmorrhage and pressure and malignant disease.

The clinical variations in Graves's disease are discussed fully and the detailed instructions concerning its management are so precise as to make this a most valuable section. In dealing with toxic adenoma, Dr. Eberts advises the use of Lugol's solution as in Graves's disease, though he states in the differential diagnosis that only rarely is it of value in toxic adenoma. The goîtres in which it does good are precisely those in which a clinical differentiation between the two varieties of toxicity may be impossible, that is cases of adenoma with suspicious eye signs, possibly due to the presence of hyperplastic tissue, and cases of true Graves's disease with an apparently nodular gland and equivocal eye signs.

In discussing thyreoiditis, Dr. Eberts advises that patients with hyperthyreoidism associated with pain and tenderness in the enlarged thyreoid should receive prolonged consideration and metabolic estimations before operation, as the thyreoids may progress to atrophy and myxœdema following a thyreoiditis simulating Graves's disease.

In the final chapter on malignant disease the view is reiterated that all adenomatous goîtres should be referred to the surgeon as possible precursors of malignant disease.

[1] "Surgical Diseases of the Thyroid Gland," by E. M. Eberts, M.D., with the Assistance of R. R. Fitzgerald, M.D., and P. G. Silver, M.D.; 1929. Philadelphia: Lea and Febiger. Post 8vo., pp. 238, with illustrations. Price: $3.50 net.

VARICOSE VEINS AND THE VENOUS FLOW.

In "Hæmodynamics," Mr. P. B. Kittel has attempted to explain many of the difficult questions associated with varicose veins.[1] His argument leads him to discussion of the action of valves in veins, compensatory dilatation applied to the formation of varicose veins, venous and capillary flow, œdema, lymphatic œdema, Raynaud's disease and Bier's spots. "The circulation in the capillaries and veins," as he states in his preface, "is dealt with in a novel manner with the use of knowledge now antique." The whole of this matter is long and very difficult to follow. This is to some extent due to a laborious, didactic and archaic style and the use of sentences of abnormal length. A typical example (page 117) is the following: "The cause of swelling till now omitted from those I have mentioned, but promised previously, is that due to some alteration in function of the lymphatic system of the body arising in the instances I have in mind from some alteration in the capacity or facility for this fluid to pass onwards and therefore obstructive in nature."

The author suggests that the idea of the reversal of the flow in varicose veins is being accepted on too little proof. He also suggests that eczema and ulceration are part of a condition in which varicosity is but a feature and are, therefore not complications of varicose veins. It would appear that the results which he has obtained in the treatment of eczema and ulcer (page 176) by injecting the veins have not been at all satisfactory and his conclusions are not in accordance with the very good results which have been obtained by many other writers.

The concluding chapters of the book contain matter of much practical interest. A new solution, sodium morrhuate, is introduced which, it is claimed, has satisfactory therapeutic effect in sclerosing varicose veins, whilst it is non-toxic. Further, it can be injected without fear of causing ulceration in amounts up to ten cubic centimetres. The use of this solution followed upon the publication of observations by Sir Leonard Rogers upon his treatment of leprosy with gynocardic acid in 1923 (page 154). Solutions of 5% and 10% are used and the author states that he has on several occasions injected 0·5 and one cubic centimetre of the 5% sodium morrhuate under the skin of his arm without noticing any redness or swelling.

[1] "Hæmodynamics: The Mechanism of Venous Capillary and Lymphatic Flow: Œdema and Injection of Varicose Veins," by P. B. Kittel, F.R.C.S.; 1929. London: H. K. Lewis and Company, Limited. Crown 8vo., pp. 206, with illustrations. Price: 10s. net.

The Medical Journal of Australia

SATURDAY, APRIL 12, 1930.

The Journal and the Profession.

The Medical Journal of Australia is the servant of the Branches of the British Medical Association in Australia. It is the coordinating link. The distances between the centres of medical activity in each State are so great that without some means of professional intercommunication little corporate life would be possible. This is the main object of the journal. It may be useful at the present time to draw attention to the activities of the journal, to point out how the journal endeavours to meet the needs of the Branches and to give an indication of some ways in which members can help the journal.

In the first place the journal is the medium by which the activities of the Branches are recorded. Papers read before a Branch automatically become the property of the Branch and are forwarded to the journal for publication. This arrangement is facilitated by the appointment in each State other than that in which the journal office is situated, of a journal representative. This officer is appointed by the journal with the approval of the Branch Council. He acts as a liaison officer between the Editor and the Branch. It is one of his duties to forward to the office of the journal accounts of the discussion held at various meetings. The journal also acts as a medium for the publication of original work in the medical sciences and for the recording of clinical observations. By this means the work done by Australian workers is brought to the notice of Australians and of workers in other countries. It is not fitting that all the work carried out in Australian laboratories should be sent abroad for publication. Conversely an endeavour is made to bring to the notice of Australian practitioners what is being done elsewhere. Abstracts from current medical literature are published in each issue and the more important work, or as much of it as can be dealt with is recorded in the editorial columns, with such explanation and comment as may appear necessary. Reviewers for books sent by publishers to the journal are carefully chosen and, since the reviews are unsigned, the Editor necessarily takes full reponsibility for statements contained in them. The reviews are not signed because it is felt that the authority of the journal is higher than the authority of an individual. The whole profession is under a debt of gratitude to the medical practitioners who undertake this work. Reports from medical societies are welcomed and these are published as space becomes available. Other matters which are handled from time to time include public health and other reports, the proceedings of the Medical Boards in the several States and such news as it may appear desirable to publish. Lastly the columns of the journal are open for correspondence on subjects of current interest.

It is evident that the activities of the journal cover a wide field. A great deal of this work necessarily falls on the shoulders of the editorial staff and on those of the representatives in the several States. But they are not concerned alone. They need the cooperation of the individual members of the Branches. The attention of members is directed to three points. Frequently when papers are read at Branch meetings, the readers of the papers come with their contribution inadequately prepared, and for this or for some other reason the paper is not handed to the journal representative. This is most embarrassing and as a result the publication of the report of the meeting and of the papers read by other authors at the same meeting is delayed. An earnest appeal is made to members to help in this matter.

Another way in which assistance may be given is in the submission of case reports with a view to their publication. It is the policy of the journal to endeavour to effect a judicious combination of clinical contributions with those of a purely scientific nature. This can be done only if the material is available. It is found necessary to make this appeal for clinical reports from time to time.

The usual result is an influx of case reports for a month or two and then the supply again becomes less. It has repeatedly been pointed out that medical practitioners have a definite duty in this regard. They have no right to keep to themselves any clinical observation of definite didactic value. Every addition to knowledge, however small, is of importance.

The third point has to do with the activities of the Printing House. The present satisfactory method of printing and producing the journal is rendered possible by the fact that The Australasian Medical Publishing Company Limited owns a large and complete printing plant. This plant obviously requires more than the weekly production of The Medical Journal of Australia to keep it going. The last half year resulted in a turnover which was most encouraging to the management, particularly in view of the present financial depression. More, however, is required. Medical practitioners can help if they will. By helping the Printing House they can help the journal. Each of them has a certain amount of printing to give away in prescription forms, account forms, receipt books and general stationery. Last year the number of medical practitioners on the books of the company was three hundred and twelve—a ridiculously small number when taken into consideration with the total of those in practice. Further, most medical practitioners belong to one or more organizations, societies or clubs. In connexion with most of these a certain amount of printing is required. The suggestion might be made that an opportunity be given to the Manager of the Company to submit a quotation. All that the Manager desires is an opportunity—the prices and the quality of the work will do the rest.

Current Comment.

THE TREATMENT OF LOBAR PNEUMONIA.

In May, 1929, attention was drawn in these pages to work recently carried out on the subject of lobar pneumonia by P. N. Coryllos and G. L. Birnbaum. These observers advanced the view that lobar pneumonia must be regarded as a pneumonic atelectasis. They believe that pneumonic infection of the bronchial tree is not by itself sufficient to produce lobar pneumonia; another factor is necessary and this factor is the occlusion of a bronchus by the pneumonic exudate. Crisis or lysis in their opinion is due to the disintegration of the fibrinous exudate of grey hepatization and to the sudden liberation of a large bronchus allowing sudden drainage of an affected lobe. As might be expected from the acceptance of such a view, they put forward the suggestion that the removal of bronchial occlusion by the bronchoscope would be of considerable assistance in treatment. They reported having used this method in the treatment of nine patients, but were able to draw no definite conclusions from the results.

Last year Yandell Henderson and H. W. Haggard reported that the inhalation of carbon dioxide is a preventive of pneumonia under certain clinical conditions. This is explained by the fact that deep breathing induced by the inhalation of carbon dioxide expands the lungs and thus prevents or relieves atelectasis. Henderson, Haggard, Coryllos and Birnbaum have now published an article on the treatment of pneumonia by the inhalation of carbon dioxide.[1] First of all they discuss the principal conditions in which atelectasis and pneumonia are associated and in which inhalation of carbon dioxide as a preventive is indicated. In the first place lack of complete distension of the lungs in the new-born, in other words partial atelectasis, predisposes to pneumonia. To overcome a continuance of atelectasis it has been usual to make the child cry for a certain period once or twice a day. The suggestion is made that the substitution of inhalations of 5% carbon dioxide would be more in accord with the teachings of physiology. Henderson has introduced this method and the authors suggest that the routine adoption of this inhalation for all infants who breathe incompletely as well as those who do not breathe without some additional stimulus, would go far towards eliminating the occurrence of pneumonia during the first few weeks of life.

In regard to the action of carbon dioxide on respiration it must be remembered that the carbon dioxide tension of the arterial blood is the same as that of the alveolar air and that it is the hydrogen ion concentration of the blood which is the active agent in the regulation of respiration. At the same time certain observers hold that carbon dioxide is a more effective stimulus than corresponds to its hydrogen ion concentration. Bayliss states that Jacobs supported this view and suggested that, since the cell membrane must be permeable to carbon dioxide in solution, although not to the hydrogen ion, the former is allowed to enter the cell as carbon dioxide and, becoming electrically dissociated after reaction with water, hydrogen ions are produced and that these are effective on coming in contact with cell structures. Acids in general, on the other hand, do not enter the cell until they have damaged the cell membrane.

The second condition referred to by Henderson and his collaborators is post-operative pneumonia.

[1] *Archives of Internal Medicine*, January, 1930.

It is stated that a death from pneumonia occurs, even in the best surgical practice, once after each two hundred and forty major operations. Workers in America and in Germany have shown that liability of post-operative atelectasis and pneumonia may be greatly reduced or almost eliminated by the routine administration of carbon dioxide at the end of anæsthesia administered for performance of an operation. This prophylactic effect is regarded as being due to the full inflation of the lungs by the deep breathing induced by the inhalation.

Pneumonia after asphyxia, such as that produced by carbon monoxide poisoning, is the third condition to which Henderson and his three fellow workers refer. It is pointed out that prior to the introduction of the treatment of carbon monoxide poisoning by the inhalation of carbon dioxide and oxygen it was held that some degree of bronchopneumonia was present in nearly all patients who did not succumb at once after asphyxia by coal gas. Since this treatment was introduced, many hundreds of patients have been treated by this means without the occurrence of pneumonia in any of them.

In the first part of their experimental work Henderson, Haggard, Coryllos and Birnbaum, sought to determine the effectiveness of the inhalation of carbon dioxide in redilating a lung that had been made to collapse by simple obstructive atelectasis without infection. Twenty-four dogs were used. After anæsthetization the right bronchus in each animal was plugged by an india rubber bag introduced by the bronchoscope and inflated with water. On the second day, after atelectasis had occurred, the bronchial plug was removed and the animal was placed in an atmosphere of air to which 5% to 7% of carbon dioxide had been added. After thirty to sixty minutes the animals were removed from this atmosphere and examined by X rays. The condition of the thorax by this time was practically normal. The controls for this observation were the observations by Coryllos and Birnbaum, made some time previously, that the thorax of animals whose bronchi were plugged in the same way, became normal in the course of several hours when the animals were allowed to breathe ordinary air.

In order to determine whether the vagi have any influence in the production of atelectasis the same experiments were repeated, but the vagus nerve was cut before the introduction of the plug and the peripheral end was stimulated. There was no variation in the results.

Experiments were carried out to determine the result of carbon dioxide inhalation in pneumonia. Twenty-eight dogs were anæsthetized and given insufflations of pneumococci. Six of the animals were used as controls. Of the twenty-two remaining dogs sixteen developed pneumonia. The infection was severe and judged from the condition of the controls and from previous experience, few, if any, would have survived. After these animals had spent periods varying from two to twenty-four hours in an atmosphere containing from 5% to 7% of carbon dioxide, all except three made a complete recovery. Particular attention is drawn to the fact that the time required for the recovery from pneumonia is much longer than that required for recovery from atelectasis without infection of the lung.

The first point which Henderson and his collaborators make in their discussion, is that the X ray pictures and the effects of inhalation of carbon dioxide were closely similar in the two sets of experimental observations. They regard this as conclusive proof that atelectasis is a factor in pneumonia. This may be granted. They go on to state that pneumonia derives its virulent character from the fact that it is an occluded infection. The chief effect of opening up the pneumonic lung is to provide drainage. They add that there may be chemical and bactericidal effects and promise a paper on this aspect of the subject. They state that several hundred patients have been treated with oxygen and 5% carbon dioxide by means of inhalators of the type employed in resuscitating patients suffering from carbon monoxide asphyxia. In one group of one hundred and twenty-six patients only nine died and a number recovered by crisis immediately after the inhalation. The deaths were nearly all among those in whom treatment had been undertaken late in the infection. In a larger group of patients not treated in this way the mortality was 31%. These observations are to be continued and reported later. For this reason no opinion can be formed from these figures. In the absence of clinical histories it is impossible to be certain that the patients treated at an early stage by carbon dioxide, really had pneumonia. At the present time it is wise to keep an open mind on the whole subject. One thing is certain and that is that the treatment by carbon dioxide inhalation is much more acceptable than the barbarous method of inserting a bronchoscope into the respiratory passages of such acutely ill persons as pneumonia patients for the purpose of aspirating tenacious secretions, advocated previously by Coryllos and Birnbaum. The further communications which have been promised from this group of workers will be awaited with interest.

TRACHEOTOMY.

Tracheotomy may be performed at too high a level. A patient so treated was recently demonstrated.[1] The original operation had occurred when the child was five and the tube had been inserted through the thyreoid cartilage and the crico-thyreoid membrane. There was much scarring in the glottis. The patient was seventeen years old. It was pointed out in discussion that sometimes the wearing of too large an intubation tube may result in a cure. Generally it is wisest to make a second lower opening and give the larynx complete rest.

[1] *Proceedings of the Royal Society of Medicine*, January, 1930.

Abstracts from Current Medical Literature.

PÆDIATRICS.

Congenital Pyloric Stenosis.

C. U. Moore, J. L. Brodie, H. G. Dennis and R. B. Hope (*Archives of Pediatrics*, July, 1929) have made a clinical study of congenital pyloric obstruction. The condition is now quite common, the underlying pathology being spasm of the pylorus with or without hypertrophy. Apparently the spasm is caused by an imbalance of the autonomic nervous system. The authors found experimentally that as a result of vitamin *B* deficiency myelin degeneration occurred in the vagus nerve and a condition of pyloric obstruction was found in a number of albino rats, especially in the young of the second generation. The hereditary factor may then be due to a poor supply of or a great demand for the antineuritic vitamin. Both pyloric obstruction and beri beri occur with much more frequency in males than in females. With regard to surgical treatment, the Fredet-Rammstedt operation gives the lowest mortality. Hoas states that the success of this operation depends on severing the nerves through which the reflexes are produced. Medical treatment has the same object in view. Some use papaverine which is thought to act by decreasing the tone of smooth muscle, thereby making it less susceptible to impulses. The more commonly used drug is atropine which acts by paralysing the nerve endings of the parasympathetic. Experimental work has shown that in order to protect the young the pregnant and lactating mother needs three or four times as much vitamin *B* as is necessary for herself. The authors advise giving three grammes of desiccated yeast every day to pregnant and lactating women. They also use yeast in the medical treatment of babies with pyloric obstruction.

Cause of Death in Diphtheria.

J. Greengard (*Archives of Pediatrics*, July, 1929) has investigated the cause of death in 116 diphtheria patients. Of these 93% were of the white race and over half were under five years of age. Thirty-nine received no antitoxin before admission and twenty-nine received inadequate dosage. Twenty-seven received antitoxin within forty-eight hours of the onset and twenty-three within the succeeding twenty-four hours. In those patients who received an adequate dose promptly, the author suspects an especially virulent strain of organism. On admission 91% gave evidence of much toxic absorption, the remaining 9% being only moderately affected. In 8% a diagnosis of diphtheritic myocarditis was made. The author states that the outstanding catastrophe in diphtheria is circulatory collapse. Marvin considers that a true toxic myocarditis occurs in many severe cases and probably in all patients who have shown clear signs of circulatory failure; also there may be in addition to this or independent of it, a failure of the peripheral circulation. Edmunds and Johnston attribute the circulatory collapse to the action of toxins on the myo-neural junctions of the splanchnic nerves, resulting in a vaso-dilatation of the splanchnic plexuses and consequently a distributive oligæmia. The author favours Marvin's view. Asphyxia was found to be an uncommon cause of death.

Cœliac Disease and Beri Beri.

S. V. Hoas (*Archives of Pediatrics*, August, 1929) studies the relationship between cœliac disease and beri beri. This relationship has been noted by many authors and some have even claimed that the diseases are identical. In some severe cases of cœliac disease many of the symptoms are very similar — œdema, pallor, dyspnœa, cardiac dilatation, paræsthesias, weakness, irritability, paralyses. The pathology of the two diseases is also very similar. The author quotes five cases and gives details. He explains the similarity as follows: Beri beri is due to the absence of vitamin *B* from the diet. Cœliac disease is characterized by an inability to utilize carbohydrates which are the chief carriers of vitamin *B*. The end result in either case is the same, whether the vitamin is not ingested or whether it is not absorbed. When banana is used in the treatment of cœliac disease, vitamin *B* is presented in a form which is assimilable.

Congenital Neurosyphilis.

F. R. Ferguson and Macdonald Critchley (*The British Journal of Children's Diseases*, July-September, 1929) have made a clinical study of congenital neurosyphilis. They emphasize the importance of looking for stigmata such as stunted growth, Hutchinson's teeth, interstitial keratitis, chorioido-retinitis, cardiac murmurs, kyphoscoliosis, rhagades, frontal bossing, hair abnormalities, scars on legs, leukoplakia, saddle nose, enlarged liver *et cetera*. They also stress the necessity of a careful inquiry into the previous history for evidence of iritis, fits, backwardness, jaundice, snuffles, rashes *et cetera* and the importance of a complete family history. Visceral and integumental signs may be found together in infants. Congenital neurosyphilis gives rise to cortical cell atrophy and sclerosis with resulting mental defect, convulsions and spastic paraplegias, whereas acquired syphilis is characterized by central softening from arterial disease producing hemiplegia and monoplegia. Pathological changes, such as meningitis, endarteritis and gummata, may occur in both types. In order to make a diagnosis of congenital neurosyphilis it is necessary to have: (i) the family and previous histories, (ii) the presence of stigmata or visceral signs, (iii) serological data, (iv) the presence of neurological signs or symptoms. In the authors' opinion the fourth point must be present. They found from a review of fifty records that 32% of conditions were diagnosed as congenital general paralysis, 12% as congenital taboparesis and 14% as congenital tabes; the others illustrate the possible clinical manifestations of congenital neuro-syphilis and fall under the following headings: (i) Epileptiform convulsions, (ii) mental defect, (iii) meningitis, (iv) hydrocephalus, (v) cranial nerve palsies, (vi) paralyses of the extremities, (vii) "the nervous child." The authors also point out the possibility of parental syphilis being an ætiological factor in the production of mongolism and quote several observers' evidence in favour of this view. They suggest that mongolism may be the indirect result of syphilis acting primarily through one of the endocrine glands, possibly the pituitary. In their series no mongols were found.

Intussusception.

J. D. R. Murray (*British Journal of Children's Diseases*, April-June, 1929) describes eight cases of acute intussusception. All the patients were healthy, robust males and the ages ranged from three to twenty-two months. The six children under twelve months of age were all breast fed. Two died and in both these patients the intussusception could be felt on rectal examination. In every case the wall of the lower part of the ileum which was the starting point in all, was considerably thickened. From careful inquiry it seems that irregularities of diet frequently preceded the onset of intussusception, even in those children who are said to be breast fed. Two of the author's series had three intussusceptions during a period of thirteen months, though most observers agree that recurrences are rare. The author believes that laparotomy and open reduction is the only rational and scientific treatment, although something may be said in favour of manipulative reduction under anæsthesia combined with X ray examination after a barium enema. With regard to ætiology, he points out that during the first year of life the amount of lymphoid tissue in the lower part of the ileum is large and the lumen of the gut is proportionately small. Hypertrophy of this lymphoid tissue may act as a foreign body within the lumen and this hypertrophy may occur as a result of intestinal irritation following upon dietetic errors.

Nervous Complications in Pertussis.

W. G. Sears (*The British Journal of Children's Diseases*, July-September, 1929) is of the opinion that the primary cause in all types of nervous complications in pertussis is a toxic one and that a meningo-encephalitis is the primary lesion in most instances. Whether the toxin is produced by the Bordet-Gengou bacillus itself or by some other virus which it activates, it is impossible to say. A mechanical factor alone could not

account for meningo-encephalitis, cerebral softening and peripheral neuritis. When large hæmorrhages occur, however, it is possible that a mechanical factor is superadded.

ORTHOPÆDIC SURGERY.

Polyarthritis.

LEONARD G. ROWNTREE AND ALFRED W. ADSON (*Journal of the American Medical Association*, July 20, 1929) describe the results obtained in some cases of polyarthritis after the release of the extremities from sympathetic control. They found relief from coldness of the extremities, considerable sweating, tender, painful and swollen joints and trophic changes in the muscles, skin and nails. They insist that the intelligent selection of patients is a factor that is of paramount importance and suggest that sympathetic ganglionectomy may be of little if any value in arthritis associated with definite bony changes.

Manipulative Treatment of Talipes.

E. D. W. HAUSER (*Journal of the American Medical Association*, August 31, 1929) describes a manipulative method of treatment for recalcitrant and neglected clubfoot by means of footboards with semielastic band and cylindrical handle. The board is placed against the plantar surface of the foot; the band is placed round the dorsum of the foot and the board, the former being protected by a piece of felt. By means of a cylindrical handle the board is screwed down to the foot like a Spanish windlass, the tissues being gradually stretched until the *cavus* deformity is corrected. Tension is put on the *tendo Achillis* by holding the upright handle attached to the board and the foot is then twisted into abduction and a *valgus* position.

The Radicular Syndrome in Hypertrophic Osteoarthritis of the Spine.

LEWIS GUNTHER AND JOHN J. SAMPSON (*Journal of the American Medical Association*, August 17, 1929) describe the characteristics, differential diagnosis and treatment of radicular pain and its differentiation from heart pain. The former bears a close relation to motion of the spine and relief is obtained by use of mechanical appliances and a non-resistant surface for sleeping. It is delineated in broad belt-like zones along well defined spinal root dermatomes and is constantly present in the back of the chest as well as over the præcordium. Associated sensory changes can be demonstrated which are bilateral and which follow the spinal root zone distributed in front and back. Radicular pain does not respond to vasodilators.

Supracondylar Fracture of the Humerus.

A. BECK (*Münchener Medizinische Wochenschrift*, December 27, 1929) describes his method of reduction and treatment of supracondylar fracture of the humerus in children. Under deep narcosis the upper arm is held tightly by an assistant. The operator then takes the forearm and bends it to a right angle with the upper arm and places it in a position of extreme pronation. This is the most important step in the whole procedure. His other hand grasps the upper arm so that the ulnar margin exercises pressure on the olecranon process. While this pressure is maintained the hand grasping the forearm pulls the latter outwards and downwards besides giving it a rotary motion upwards. Plaster bandages are now applied direct to the skin, extending from the shoulder to the wrist. The arm is suspended to a frame and the child kept in bed for at least eight to fourteen days. The elevation of the arm tends to prevent œdema. The fingers and wrist can be freely moved. The plaster is removed in four to five weeks. Ankylosis of the elbow joint has not been noted.

The Osteochondritides.

JOSEPH BUCHMAN (*Surgery, Gynecology and Obstetrics*, October, 1929) considers that the separately described conditions such as Legg's disease, Perthes's disease, Calvé's disease of the spine, Osgood-Schlatter's disease of the tibial tubercle and Köhler's disease of the tarsal scaphoid are manifestations of a systemic affection. Each lesion is associated with a definite age period and in each the age period is that in which the affected bone nucleus normally is undergoing active development. He found a normal phosphorus and calcium content of the blood serum in over fifty patients with various forms of osteochondritis and there was no clinical or radiological evidence of rickets. The pathology is not well established, but various observers have found an invasion and proliferation of cartilage and a breaking-up of the epiphyseal cartilage. Trauma in the form of increased stress and strain is in all probability a very important factor. The reaction of the epiphyseal areas varies according to the condition of the circulation; where the latter is sufficient there is a lamellar deposit of bone, where it is insufficient there is absorption and even total necrosis of bone and marrow. The clinical picture is almost always mild. The radiological picture is one of widening of the epiphyseal line and irregular outlines of the already ossified bony portion. Treatment must be systematic until our knowledge is more complete and consists in relief of pain and prevention of deformity.

Congenital Dislocation of the Hip.

HENRY O. FEISS (*Surgery, Gynecology and Obstetrics*, October, 1929) states that the essential in his method of treating congenital dislocation of the hip is persistence in securing adequate reduction until the head stays in its new place, even when moderately large movements of the thigh are made to test it. If necessary, the adductors are divided by tenotomy. The retentive apparatus consists of one large abdominal cuff, two cuffs for the thighs and two for the upper parts of the legs. All are made of aluminium, faced with felt at least 2·5 centimetres (one inch) thick and fastened to the enclosed parts with straps and buckles. A connecting iron post on each side passes through a box in each cuff to which it is fastened by screws. These posts serve to maintain the parts in their desired relationship.

Extraarticular Fixation of the Sacro-Iliac Joint.

W. M. PHELPS AND M. K. LINDSAY (*Surgery, Gynecology and Obstetrics*, October, 1929) describe a method of fixation of the sacro-iliac joint by means of a bone graft driven through a drill hole in the bases of the iliac processes and the intervening sacral spine. Three patients treated by this method all returned to their customary manual labour within four months and were symptom-free after one year.

The Paralyses of Pott's Disease.

EDWARD A. RICH (*The Journal of Bone and Joint Surgery*, January, 1930) discusses the paralyses of Pott's disease. He finds that paralysis is most frequent among patients treated by so-called ambulatory methods, the percentage being as high as 90 of all Pott's paralyses. The types of Pott's disease in which recovery occurs, begin as a rule with a sudden onset and complete paralysis of the affected limbs, as a rule favourable in outlook. The simplest of these is the œdema of the cord, other types being due to a kink of the cord from angulation and others from pressure of the contents of an abscess. The type resulting from kinking by angulation is the only one warranting surgical treatment. The type which does not recover is that starting late in Pott's disease, being slow and progressive and incomplete; it is usually due to the inoperable changes of pachymeningitis.

Vasomotor and Reflex Sequelæ of Unilateral Cervical and Lumbar Ramisection.

JOHN F. FULTON (*Annals of Surgery*, 1928) describes the changes occurring in a patient afflicted unmistakably with Raynaud's disease in all four extremities. The observations made up to a year subsequent to operation are as follows: Radial periarterial sympathectomy was unsuccessful. Immediately after ramisection involving the fifth, sixth, seventh and eighth cervical and first thoracic nerves all deep reflexes which preoperatively had been equal, were definitely depressed on the side operated upon. One year after operation the alteration in the reflexes persisted. After ramisection involving the second, third and fourth lumbar rami the right foot became 3° C. warmer than the left foot. Horner's syndrome was noted on the right side. These changes persisted up to one year after the operation. A permanent and pronounced diminution of resting tonus persisted in the right lower extremity.

British Medical Association News.

MEDICO-POLITICAL.

A meeting of the New South Wales Branch of the British Medical Association was held at the Royal Society's rooms, 5 Elizabeth Street, Sydney, on March 20, 1930, Dr. E. M. Humphery, the President, in the chair.

Advertisement in the Daily Press.

Dr. C. B. Blackburn, on behalf of the Council, brought forward the question of advertisement in the daily press by members of the Branch of the resumption of practice. He explained that he had brought the matter before the Council, for he could see that this form of advertisement served no useful purpose. He therefore moved:

> That By-law 9 (b) be amended by the omission therefrom of the words "or resumption;" so that it will read:
>
> (b) No member shall insert any advertisement relating to his profession or the practice thereof beyond an announcement of change of address or commencement of practice;
>
> and that the following consequential amendments be made, namely:
>
> (a) That By-law 9 (b) (iii) be omitted.
>
> (b) That By-law 9 (b) (ix) be amended by the insertion therein of the word "or" before the word "commencement" and by the omission therefrom of the words "or resumption."
>
> (c) That By-law 9 (b) (x) be amended by the omission therefrom of the words "Resumption of Practice shall mean resumption of practice after an absence therefrom of not less than four weeks."

Dr. Blackburn explained that the effect of the motion, if carried, would be the prohibition of all advertisements in regard to the resumption of practice. The motion was seconded by Dr. Andrew Davidson.

Considerable discussion followed, during which it was apparent that the general feeling of the meeting was in favour of the prohibition of all forms of advertisement.

The motion was carried.

On a motion of Dr. J. Colvin Storey it was resolved:

> That it be a recommendation to the Council that steps should be taken to stop all forms of advertising.

NOMINATIONS AND ELECTIONS.

The undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Grey, William Scorboria, M.B., 1929 (Univ. Sydney), 57, Dudley Street, Lidcombe.

Noad, Kenneth Beeson, M.B., Ch.M., 1924 (Univ. Sydney), Grassmere Road, Neutral Bay.

Symington, Norman John, M.B., Ch.M., 1926 (Univ. Sydney), 315, Mowbray Road, Chatswood.

The undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Bray, Sylvia Dean, M.B., B.S., 1929 (Univ. Sydney), Sydney Hospital, Sydney.

Keatinge, Leila Kathleen, M.B., 1925 (Univ. Sydney), "St. Martin's," Loftus Road, Darling Point.

Lawler, Noel Ambrose, M.B., 1922 (Univ. Sydney), 425, Bourke Street, Darlinghurst.

McClelland, Henry Walter Hamilton, M.B., B.S., 1929 (Univ. Sydney), "Linthorpe," Linthorpe Street, Newtown.

Paterson, Robert Francis, M.B., Ch.M., 1926 (Univ. Sydney), "Hengrove Hall," 193, Macquarie Street, Sydney.

Salisbury, Charles Victor, L.R.C.P. (Edinburgh), L.R.C.S. (Edinburgh), L.R.F.P.S. (Glasgow), 1928, "Glenhope," Pennant Hills.

Audley, William Ernest, M.B., 1929 (Univ. Sydney), c.o. Dr. Hodgkinson, Orange, New South Wales.

Doyle, Percy Hugh, M.B., 1928 (Univ. Sydney), Sydney Hospital, Sydney.

Maffey, Reginald Errol, M.B., B.S., 1929 (Univ. Sydney), c.o. Mrs. Falkiner, Roslyn Avenue, Roseville.

Wiseman, John Elliott, M.B., B.S., 1929 (Univ. Sydney), Sydney Hospital, Sydney.

Medical Societies.

THE NEWCASTLE HOSPITAL CLINICAL SOCIETY.

A meeting of the Newcastle Hospital Clinical Society was held at the Newcastle Hospital on July 4, 1929. The meeting took the form of a series of clinical demonstrations by the members of the honorary staff.

Smith's Fracture of the Right Radius.

Dr. C. R. Furner showed a motor mechanic who on April 17, 1929, had sustained a Smith's fracture of the right radius which was almost compound. This had been reduced under anæsthesia by Dr. Keirle at Newcastle Hospital and two radiographs taken since had shown the fragments to be in accurate apposition. Within two days of the injury the patient had noticed loss of epicritic sensation along the distribution of the median nerve with hyperæsthesia along the radial side of the thumb. The hand had also been swollen on the dorsum. Massage had been commenced after two weeks, the splints had been removed after three weeks.

The hand had become gradually more swollen and the dorsum was œdematous, red and very cold in its lower two-thirds. It was warm in its upper third with a bright red band about five centimetres (two inches) wide from the carpus proximally, though this was not swollen. This swelling was increased by heat of bed clothes or hot air machine. It was worst when the patient awakened and subsided a little if the hand was placed on a cold surface or if it were held out in the cold air.

On June 16, 1929, œdema of the forearm had appeared. It had spread from the elbow distally for 7·5 centimetres (three inches) where it ended abruptly. This had been very red and very itchy. It had disappeared in about three days and had been apparently an angio-neurotic œdema. It was thought that the change from wearing a rough to wearing a silk sleeve might have hastened its disappearance.

Dr. Furner said that Dr. F. G. N. Stephens with whom he had discussed the case, had told him of a similar condition in a patient whom he had sent to Dr. E. B. M. Vance. The latter had been informed by a Russian anatomist of a sympathetic ganglion on the dorsum of the hand. This anatomist had suggested that there was a terminal filament of the posterior interosseous nerve, which consisted entirely of sympathetic nerve filaments, and which ended in a ganglion on the dorsum of the hand after crossing over the posterior surface of the radius and carpus. It was the severing of this filament in fractures of the lower end of the radius which caused the vasomotor disturbance and the prognosis was that until these filaments regrew or established conduction the swelling would persist. Dr. Furner went on to say that the questions which arose were: (i) If the sympathetic filament were destroyed, why was the hand not warm and flushed as after a sympathectomy? (ii) If the sympathetic filament was only irritated, why was the hand so œdematous? (iii) What was

likely to be the period of incapacity? This was important from the compensation aspect.[1]

Acute Torsion of the Fallopian Tube.

DR. A. F. QUAYLE showed a single woman, aged twenty-one years, who had come complaining of pain in the right side of the lower part of the abdomen and round the back for three days. She had had a similar but not so severe attack three months previously. She had vomited on several occasions. Her menstrual periods had been irregular, occurring every five to six weeks. She had gone three months on occasion without a period. The last menstrual period had occurred one week before admission and had been normal. The patient had had a white intermenstrual discharge. No urinary symptoms had been present and the action of the bowels had been regular.

On examination the circulatory and respiratory systems had been clear. The abdomen had been tender all over the lower portion, especially on the right side. No rigidity and no hyperæsthesia had been present. The temperature had been 37·25°C., the pulse rate 96 and the respiratory rate 24 in the minute. The vagina had admitted two fingers easily. The cervix had been in the mid-line and the uterus small and anteriorly placed. A very tender cystic mass had been palpable in the right fornix. It had been regarded as either an ovarian cyst, a tube or an ectopic pregnancy.

At operation a mid-line incision had been made and a tumour about the size of a billiard ball, dark red in colour, had been found near the free end of the right tube, which was twisted three to four times just proximal to the tumour. The right ovary had appeared slightly swollen and œdematous, but the proximal three quarters of the tube had appeared normal. The right tube and ovary had been removed. At a later date the tumour had been opened and had contained only a small amount of fluid, dark in colour. There had been no sign of a fœtus or any placental tissue. The patient had made an uneventful recovery and had left hospital three weeks after operation.

Dr. Quayle said that torsion of a "normal" Fallopian tube with the subsequent creation of an acute pathological condition in the abdomen appeared to be excessively rare, judging from the number of case reports culled from the literature. Cysts or tumours of ovaries with torsion were not uncommon conditions requiring surgical treatment. Less common was the twisting of Fallopian tubes that were enlarged, such as hydrosalpinx, pyosalpinx or ectopic gestation. From 1900 to 1921 there had been only fourteen cases of torsion reported occurring in normal adnexa at any period of life. Many theories attempting explanation had been put forward. The most generally accepted theory was that the tube in question had an unusually long mesosalpinx that would allow undue mobility.

Another explanation assumed that the tube twist was due to passive congestion and that the twist was imparted by the spiral course of the vessels supplying the tube. Payr, after removing a spleen, had injected the vessels and had produced as much as 125° torsion of the spleen by this procedure.

A Backward Child.

DR. J. S. BARR DAVID presented a child fifteen months old, weighing 7·4 kilograms (sixteen and a half pounds) and unable to sit up. He had first seen this child three months previously when it had weighed 6·7 kilograms (fifteen pounds) and had had an apathetic appearance. There had been no trouble with its sleep. It had been brought up on "Lactogen," "Glaxo" and cow's milk and at that time (at twelve months of age) had been on Neave's food and cow's milk, egg, gravy and orange juice. On Dr. Barr David's recommendation the diet had been made more liberal and varied, the child's age being taken into consideration. "Virol" had also been given, but the child had gained only 0·67 kilograms (one and a half pounds) in the three months. At the time of the meeting the child was brighter and took more notice of its surroundings. The child would sit up in the arms of a nurse, but as soon as the support to its back was removed, it would fall backwards. There was no paralysis and the child could move all limbs energetically, roll over on her abdomen and move from place to place by rolling over, but would not attempt to crawl. There were no deformities except in the left foot which was affected by *talipes valgus*. There were no signs of rickets. The plantar reflexes appeared to be flexor. The head circumference appeared to be normal and the child was neither a cretin nor a mongol. The child was either a backward child or mentally deficient, suffering from simple primary amentia.

Dr. Barr David asked if the administration of mixed glands would be of service. On the advice of Dr. Ewan small doses of thyreoid were being administered and nine days after the use of this extract had been started there had appeared some improvement in the mental condition.

Cyst of Foot and Menstrual Disorder.

Dr. Barr David also presented a woman, aged forty-one, who had a ganglion in front of the lateral malleolus of each foot. That on the right was interesting because it contained a loose body in addition to fluid. The right foot had been examined by X rays and there had been revealed a faint non-bony shadow 1·25 cubic centimetres (half an inch) in diameter and three millimetres (one-eighth of an inch) thick in front of the malleolus. There was no sign of tuberculous disease. Dr. Barr David had refrained from opening the cyst and removing its contents until after the clinical demonstration. The woman also suffered from a considerable degree of flat foot. Some discussion followed on the presentation of this patient.

The same woman also suffered from itching all over the body, most pronounced during the four days preceding menstruation. This itching might affect any part of the body and was most troublesome at night. For some days in the month she was quite free from itching. There was no skin abnormality and no extraneous cause for the itching which appeared to have some relationship to her menstrual function. She also had a feeling of soreness in the abdomen and back during the three days preceding menstruation and for some days thereafter she was inclined to be constipated. The urine contained no albumin or sugar. Her menstrual history was unusual. Her periods were regular. On the first day there was a scanty flow, on the second day more, for the next two days none, on the fifth day blood and mucus were passed, followed by leucorrhœa for the next five days. On examination the uterus was retroverted, the cervix felt hard, but there was no hæmorrhage. Dr. Barr David had given her tablets of glandular extracts and bromides, especially at bedtime and some relief from the itching had been obtained.

Leontiasis Ossea.

DR. A. B. K. WATKINS showed a male patient, aged forty-six, who had been referred to him by Dr. Furner, complaining that he could not shut the left side of his mouth. By passing his fingers up into his buccal sulcus, he had been able to feel bony bosses on the antro-lateral aspects of his upper jaws. The patient gave the following previous history. For ten years he had noticed the bony hypertrophy of his right alveolar margin and for three years the bosses referred to had been appearing. Extractions of teeth from the upper jaws had always been extremely difficult and on several occasions he had had sittings of over an hour, during which attempts had been made to extract a single tooth. The patient stated that on more than one occasion during the struggle, he and the dentist had ended together on the floor. Another dentist has found it necessary to divide the molars with a chisel before extracting them in two pieces. Three years previously a dental X ray picture had been taken of the right alveolar margin and this had revealed a great increase in the distance from the floor of the antrum to the alveolar margin, the distance being about 2·5 centimetres (one inch). The bone had appeared to be fairly normal in structure, although the bony lamellæ of the cancellous tissue had appeared thicker and perhaps not so dense as in normal bone. The

[1] On September 5, 1929, the hand appeared even more œdematous and cold. The nails had not been cut for five months on the affected hand and were still as short as when cut.

patient did not know of any bony abnormalities apart from those of the head. At the age of ten he had been somewhat deaf for a few years, the deafness increasing with each cold, but he thought his hearing was quite normal.

On examination, the osteomatous-like mass could be felt on the antero-lateral part of the right upper jaw, about 13 millimetres (three-quarters of an inch) in diameter and a similar one on the left side a little further back, about 12 millimetres (half an inch) in diameter. The right alveolar margin from the mid-line to its posterior extremity was uniformly hypertrophied to such an extent that the upper and lower jaws on the right side came into approximation whilst the jaws were still separated on the left side. The upper jaws were both edentulous. An X ray picture taken on May 20, 1929, at the Newcastle Hospital revealed an increase in the hypertrophy shown in the previous skiagram of three years before and the thickening of the alveolar margin was seen on the right side to be continued right up into the malar bone. The osteomatous masses were much more transparent than would have been expected. In fact the bone was of a much more transparent type than that normally met with in the skull. The pituitary fossa was normal. There was no sagging of the posterior fossa, as commonly occurred in Paget's disease. The vault of the skull was only slightly, if at all, thicker than normal. The sinuses were clear and the cavity of the right antrum was not encroached upon by bony hypertrophy. A Kline test performed on May 24, 1929, had yielded no reaction. On examination of the ear, nose and throat, the septum had been found to be wider than normal. The ears were healthy except for a little calcification in the antero-inferior part of the left tympanic membrane. No deafness was present.

Dr. Watkins said that the literature on *leontiasis ossea* had not been easy to find. In most books bearing on general or bone surgery, reference was made to the condition and in those in which the nature of *leontiasis ossea* was discussed the condition was referred to as being of different origins. It was evident that many of the writers knew no more of the condition than its name. It was frequently mentioned in connexion with pituitary disorders, with Paget's disease of bone or with von Recklinghausen's disease of bone.

Lawford Knaggs presented a chapter of thirty-four pages on the condition. He grouped the cases as follows: Group I, creeping periostitis of the bones of the face and skull. Group II, diffuse osteitis of the bones of the face and skull. The latter group he subdivided into: (i) General diffuse osteitis of the face and skull, (ii) circumscribed osteitis of the skull or (iii) an osteitis beginning in one or both jaws and rarely spreading far beyond them. He described the more classical cases.

Fourçade's patient was the first whose clinical history was reported. An account of it was given by Virchow. Fourçade had been a surgeon at Perpignan and had had a son who, except for an attack of variola, had enjoyed good health till he was twelve years of age (1734). At this time his father had opened for him near the inner canthus of the right eye a lachrymal tumour which suppurated for a very long time. There had developed at the same time on the nasal apophysis of the right superior maxilla a tumour as big as an almond, which grew till when the boy was fifteen it compressed the nasal cartilage in such a manner as to prevent him from breathing except by the mouth. The disease had then extended to the inferior maxilla which kept its normal form only at the articular extremities and alveolar borders. The superior maxillæ, the walls of the orbits with the exception of the roofs, the nasal openings, the palate and malar bones had been invaded and enlarged till they formed shapeless masses. At twenty years of age the face had been monstrous. He had had exophthalmos with myopia, difficulty in speaking and general enfeeblement. He had died blind and tuberculous at the age of forty-five.

The macerated head had weighed 3,713 grammes (eight pounds four ounces); the inferior maxilla alone 1,445 grammes (three pounds three ounces). Great tuberous and lobulated exostoses, having the density of marble, had protruded from the lower jaw and inferior borders of the orbits; the cranial bones had been thickened, with little, smooth and completely sclerosed excrescences. The frontal and maxillary sinuses had entirely disappeared. The rest of the skeleton had been remarkable for the fragility of the bones (Virchow, Lebert).

In Howship's case the skull was that of a pugilist. It was in the museum of the Royal College of Surgeons. This was another example of immense rounded bosses jutting forward from the front of the superior maxillæ. The posterior nares showed solid turbinate bones fitting into a much swollen septum. The sphenoidal sinuses were filled up with bone and the frontal sinuses were obliterated.

The conditions were more advanced on the left side. Both orbits were practically filled up with exostoses. The specimen was described by Sir James Paget. In spite of some discrepancies, there could be no doubt that it was derived from a patient described by Howship. Le Dentu, in referring to Howship's case, gave the same catalogue number as Paget.

The clinical history was interesting. The subject had been a man, about sixty years of age, who believed the disease began about eighteen years before death in consequence of repeated blows received in the face through fighting. The first symptom had been the very sudden onset of inflammation in both eyes, which evidently ended in double lachrymal abscess. This had occurred fourteen years before Howship saw the patient in 1811. After some months osseous swellings had formed below each orbit; later one eye had suppurated, its cornea had sloughed and it had shrivelled and the other, when it was protruded and lying upon the hard tumour in the cheek, had been struck by part of an iron bedstead he was handling, and burst. In 1815 the patient had been in good health. The tumours had not been tender on pressure and had appeared to occupy the whole space of each orbit, as well as the cavities of the nostrils, which were almost obliterated. There had been varicose veins in the skin covering the swellings.

Bickersteth's case was recorded in detail by Murchison. The specimen was in the museum of the Liverpool Royal Infirmary and casts of it were in the Museum of the Royal College of Surgeons; the Middlesex Hospital and at Leeds Medical School. An illustration of the patient was given in the *Liverpool Medico-Chirurgical Journal* (1857, Volume 1, page 264).

The patient was thirty-four years old when he died in 1857. At the age of fourteen the bones of the face had first been noticed to be enlarged. Three years later he had been an in-patient at Saint Thomas's Hospital for this enlargement. The swelling had gradually increased and thirteen years after its commencement a similar hard swelling had appeared along the course of the left fibula. Apart from the unsightliness, the swelling had caused the patient little inconvenience until two years before death, when he began to suffer intense pain in the leg and pain, less severe, in the head. He had become gradually emaciated and as the facial enlargement increased, the cavities of the mouth and nose had greatly lessened and the eyeballs had protruded even beyond the lids. The sight of the right eye had remained good, but that of the left had been lost.

The mobility of the lower jaw had been but slightly interfered with and mastication and deglutition had been performed without difficulty. Smell and hearing had not been affected and the intellect had been unimpaired. In the end he had become suddenly comatose without evident cause and had died. Death had been attributed to exhaustion, emaciation and protracted suffering. At the *post mortem* examination the internal organs had generally appeared healthy. The patient had never suffered from syphilis and there had been no history of tuberculous or constitutional syphilis or cancer in the family. A brother had had a similar enlargement affecting the upper jaw which began about the age of puberty, but had remained stationary for many years.

In addition to the enormous deformity of the skull and lower jaw which was very like that in Fourçade's case, the hyoid bone was also affected. The tumour of the

fibula whose cross-section measured 13·75 by 11·8 cubic centimetres (five and a half by four and three-quarter inches), sprang from the posterior and inner surface of that bone by a narrow pedicle possibly determined by fascial attachments, and it might be noted that it had a canal on its inner side evidently for a vessel of considerable size. Its characters had already been described. Part of this tumour was in the Middlesex Hospital Museum.

Dr. Watkins said that the cases he had described belonged to the spreading periostitic type. The other types Lawford Knaggs believed to be *osteitis fibrosa* involving the skull and an example of this was the Bristol skull. Dr. Watkins then gave a description of a skull in the museum of the Bristol Royal Infirmary. The account was taken from an article by Stack. The patient's photograph represented her with a very prominent over-hanging forehead and an enormous protruding lower jaw. Though the facial bones were affected, the face itself appeared insignificant between these two pronounced deformities. The half skull without the lower jaw weighed 3,401 grammes (seven and a half pounds) and the lower jaw 453 grammes (one pound). There was enormous thickening of the vault and base and this attained its maximum in the cerebellar region, where the width of the section was 7·5 centimetres (three inches). The outer surface was quite smooth and the internal almost normal. The bones of the skull were for the most part definitely softer than normal, but the appearance of the section was not quite homogenous. In parts there were masses of very dense tissue and in others there was rarefaction to such an extent as to leave spaces of three millimetres (one-eighth of an inch) in diameter. The lower jaw had a few temporary teeth (age twenty-one) on its upper surface where the alveolar ridge had been. The body was enlarged and rounded and the compact shell expanded and filled with very porous bone containing a quantity of very slimy, gummy material which poured out when the bone was incised. Several of the permanent teeth were buried in the under part of the bone quite on its lower aspect.

Notable changes were also present in some other bones. The pelvis was generally contracted and definitely beaked and twisted, the sacrum being deflected to the right. There was slight scoliosis, but the vertebræ and ribs were normal in consistency. The femora were slightly bent and softer than natural. The right tibia was bent laterally, chiefly at the lower end of the upper third and there was also a slight antero-posterior curve of the whole bone; the outer face of the upper articular surface sloped downwards and outwards and a definite *genu valgum* had been present on this side.

The patient, a female, aged twenty-one, had been admitted to the Bristol Royal Infirmary under the care of Dr. Waldo in December for sore throat and dyspnœa and had died the same night. When three years old she had fallen, cutting her forehead and had been in the General Hospital for several weeks. The mother had first noticed the child's head at the age of seven to be larger than natural. At twelve she had the right canaliculus slit up for dacryocystitis. At nineteen she had fractured the lower end of the right femur which had united in two months. The mother had thought that the lower-jaw deformity began at the same time as that of the head. Mentally she had been normal and a great help to her mother, though she tired too easily to be of use in housework. She had not had fits and there had been no sign of syphilis in either parent or the other children. She had died after tracheotomy during diphtheria and the dyspnœa had been in part due to a firm fibro-sarcoma containing numerous giant cells which grew from the posterior surface of the hard and soft palate.

Thomson and Miles in their surgical text book referred to a type of *leontiasis ossea* which commenced in the upper jaw, was usually unilateral and did not progress if the affected part of the upper jaw was removed. They had one such patient under their own care.

Dr. Watkins said that the patient shown by him that evening appeared to be suffering from the third variety of the second group and it was likely that the condition would not progress very much further. It was proposed to remove the bosses and trim down the right alveolar margin until the patient could close his mouth.

If a mistake had been made and the condition was one of the other types, no form of treatment short of removal of both upper jaws would cure the patient, and, as this was an unjustifiable operation for this condition, he would not consider doing anything more than the local removal referred to.

A Case for Diagnosis.

DR. A. F. QUAYLE, showed a woman, aged twenty-five years, who had been admitted late in the evening of June 2, 1929, with a history of hæmorrhage *per vaginam* at dinner time that day. She had passed some large clots and smart gushes were still occurring. She had noticed her skin becoming a darker colour that afternoon. She had denied any interference or taking of drugs. The last menstrual period had been two months previously. She had had three children, the first eight years before, when she was sent into hospital because it was thought that she was going to have fits; no fits had occurred and she had had no trouble either with the second child or with the last five years before. She had not had any previous miscarriages. She was subject to "bilious attacks" during which she became giddy and vomited. During the previous twelve months she had had five or six "fits." These came on suddenly and she fell down, on one occasion injuring her hip. The right arm always became stiff and her hand was clenched. She lost consciousness. There was no family history of epilepsy. During the past six months she had noticed that she became breathless very easily.

On examination the patient had had a bright reddish bronze colour all over the body and the sclera had appeared to be deeply jaundiced. The skin had been cold and sweating profusely. The mental condition had appeared normal. Respirations had been 24 per minute and shallow. There had been no definite abnormality in the breath sounds. The pulse had been of moderately good quality, 110 per minute. The lips and finger nails had appeared cyanosed. The systolic blood pressure had been 110 and and the diastolic pressure 66 millimetres of mercury. There had been general tenderness over the lower part of the abdomen, but no rigidity. *Per vaginam* bleeding had been moderate. The fundi had been normal. The next morning the condition had been worse and the colour unchanged. The pulse had become more rapid and running, the lips and finger nails more cyanosed.

The patient's bladder had been catheterized and 300 cubic centimetres (ten ounces) of deep reddish brown urine withdrawn. There had been no deposit on centrifuging. The uterus had been found to be somewhat enlarged and retroverted. Curettage had produced some small remnants of placenta and there had been no obvious infection present. The following morning the patient had been much improved, the colour rapidly disappearing. The urine had still been the same colour and examination had revealed it to be slightly alkaline. It had contained blood, hæmoglobin, no bile. Two hundred pus cells per field had been present, but no red blood cells; some *débris* possibly due to broken down red cells had been found, but no casts. The addition of alkali had turned the urine a pink colour.

The blood count had been as follows:

Erythrocytes, per cubic millimetre ..	2,560,000
Hæmoglobin value	56%
Leucocytes, per cubic millimetre	26,200
Neutrophile cells	90%
Small lymphocytes	8%
Mononuclear lymphocytes	2%

The colour index had been unregistrable owing to the presence of hæmoglobin in the serum.

The film had manifested anisocytosis and poikilocytosis. Many red cells had been crenated, others had been affected by cloudy swelling and fragmentation.

Van den Burgh's test had not yielded a reaction to the direct test, but with the indirect test a trace only of bilirubin had been found. The red cells had been found to be fragile both in the slides and by the saline concen-

tration tests. The blood serum had been a bright red colour. The Wassermann test had yielded a reaction. Incubation of blood had yielded no growth. Swabbings from the tonsils had yielded no growth. From the uterus *Bacillus coli* and staphylococci had been grown. The fæces had been dark coloured, but had contained no blood pigment. Dr. Quayle raised the question as to whether the condition was the result of a drug.

The Armit Fund.

THE late Henry William Armit whose sudden death occurred after a very short illness on March 12 last, came to Australia in 1914 at the invitation of The Australasian Medical Publishing Company, Limited, to become Editor of the journal, which position he had occupied ever since. In addition it was largely due to his efforts that The Printing House of the company was established and he was Manager for over two years as well as being Editor of the journal.

The question of recognition by the profession of the services rendered by the late Dr. Armit was considered at a recent meeting of the Board of Directors. As is well known, Dr. Armit laboured unstintingly for the profession for fifteen years; he was always approachable by any and every one who wanted help or advice in professional work or research or in publication. He was especially helpful in making available full and correct references to those who desired them in connexion with any special subject. In consequence much of his journalistic work was carried home to be done at nights and week-ends and little thought did he give for the future. To compensate in some way to his widow and daughter for the sacrifices he has made, it has been decided to open a fund for contributions. It is confidently expected that a great many practitioners will welcome the opportunity of showing in some way their appreciation of his services. Contributions may be sent to "The Armit Fund," care of the Honorary Secretary of each individual Branch in Australia who will forward them on to the Secretary of The Australasian Medical Publishing Company, Limited, 21, Elizabeth Street, Sydney, or contributions may be sent direct to the Secretary of the Company. The names of contributors will be acknowledged in THE MEDICAL JOURNAL OF AUSTRALIA.

T. W. LIPSCOMB,
Chairman,
The Australasian Medical Publishing Company, Limited.

Post-Graduate Work.

POST-GRADUATE COURSE IN ADELAIDE.

THE ADELAIDE PERMANENT POST-GRADUATE COMMITTEE announces that a post-graduate course of instruction will be held in Adelaide from May 26 to 31, 1930. This is the first course that has been arranged by the Committee and it is hoped that as many members of the Branch as possible will attend. The fee will be two guineas. Those who do not join the course, will be allowed to attend the two lectures by Sir Richard Stawell on the payment of one guinea. Those who intend to join, are asked to communicate as soon as possible with the joint Honorary Secretaries, Dr. R. Burston and Dr. F. N. Le Messurier, North Terrace, Adelaide.

The programme is as follows:

Monday, May 26, 1930.

8.45 to 9.15 a.m.—Registration at the Adelaide Hospital.

9.30 to 11 a.m.—Dr. M. Scott: "Fractures," at the Adelaide Hospital.

11.15 a.m. to 1 p.m.—Dr. D. Cowan: "The Modern Treatment of Phthisis," at the Adelaide Hospital.

2 to 3.30 p.m.—Dr. L. B. Bull: "Laboratory Aids to Diagnosis," at the Adelaide Hospital.

3.30 to 5 p.m.—Dr. A. Jones: "Surgery of the Hand and Wrist," at the Adelaide Hospital.

Tuesday, May 27, 1930.

9.30 to 11 a.m.—Dr. F. S. Hone: "Common Dyspepsias," at the Adelaide Hospital.

11.15 a.m. to 1 p.m.—Sir Henry Newland: "Dyspepsias from the Surgical Aspect," at the Adelaide Hospital.

2 to 3.30 p.m.—Dr. H. Mayo: "Some Problems in Infant Feeding," at the Children's Hospital.

3.30 to 5 p.m.—Dr. J. S. Verco: "Radiology," at the Children's Hospital.

Wednesday, May 28, 1930.

9.30 to 11 a.m.—Dr. L. O. Betts: "Surgical Conditions In and Around the Hip Joint," at the Children's Hospital.

11.15 a.m. to 1 p.m.—Dr. E. B. Jones: "Pulmonary Disease in Children," at the Children's Hospital.

2 to 5 p.m.—Dr. M. H. Downey: "Mental Diseases Met with in General Practice," at the Mental Hospital.

8.30 p.m.—Sir Richard Stawell: "Coronary Thrombosis," at the University of Adelaide.

Thursday, May 29, 1930.

9.30 to 11 a.m.—Dr. C. T. de Crespigny: "The 'Failing' Heart," at the Adelaide Hospital.

11.15 a.m. to 1 p.m.—Dr. B. Smeaton: "Surgery of the Urinary Tract," at the Adelaide Hospital.

2 to 3.30 p.m.—Dr. P. S. Messent: "Modern Methods of Treatment of Varicose Veins," at the Adelaide Hospital.

3.30 to 5 p.m.—Dr. I. B. Jose: "Treatment of Common Infections of the Urinary Tract," at the Adelaide Hospital.

8 p.m.—Dr. Fay Maclure: "The Listerian Oration" (under the auspices of the South Australian Branch of the British Medical Association).

Friday, May 30, 1930.

9.30 to 11 a.m.—Dr. R. Magarey: "Use of Radium in Gynæcology," at the Adelaide Hospital.

11.15 a.m. to 1 p.m.—Dr. B. H. Swift: "Antenatal Difficulties," at the Queen's Home.

2 to 5 p.m.—Dr. T. G. Wilson: "Some Problems in Obstetrics," at the Queen's Home.

8.30 p.m.—Sir Richard Stawell: "Encephalitis and Inflammatory Conditions of the Brain," at the University.

Saturday, May 31, 1930.

9.30 a.m. to 12 noon.—Dr. D. L. Barlow: "Asthma," at the Verco Buildings.

COURSE ON OBSTETRICS IN MELBOURNE.

THE MELBOURNE PERMANENT COMMITTEE FOR POST-GRADUATE WORK announces that a post-graduate course in obstetrics will be held from November 10 to 22, 1930, at the Women's Hospital, Carlton, Victoria. The course will comprise attendance at the routine work of all departments of the hospital, as well as at special demonstrations and lectures by members of the honorary staff. Arrangements have been made whereby a limited number of graduates will be enabled to enter into residence at the hospital for this period. The fee for the course is three guineas and an additional charge of four guineas a week will be made for board and lodging. Applications should be made to the Honorary Secretary of the Committee, 12, Collins Street, Melbourne.

Public Health.

MEDICAL CERTIFICATES OF CAUSES OF DEATH.

WE are in receipt of a letter from the Government Statist of Victoria in which he draws attention to a resolution passed at the second session of the Federal Health Council of Australia, held at Melbourne in March, 1928. According to this resolution it was held to be desirable that the practice of referring to the certifying doctors medical certificates containing indefinite or misleading terms should be adopted in all States and carried out as extensively as was necessary.

The Government Statist in Victoria proposes to introduce this practice. He asks for the cooperation of the members of the medical profession. He also wishes it to be known that the information is required for purposes of classification only and will be treated as strictly confidential.

Special Correspondence.

LONDON LETTER.

By OUR SPECIAL CORRESPONDENT.

Industrial Museum.

ABOUT two years ago the Home Office in London opened an Industrial Museum in Horseferry Road, S.W.1, containing an exhibition of the methods, arrangements and appliances which are already in use, or are suggested for use, to insure the safety and health of industrial workers. This museum is a permanent institution and is open to the public daily, though, of course, it is of more definitely practical interest to those who work in industrial areas.

The exhibition is continually being added to as new knowledge is acquired of industrial diseases and fresh devices are invented to secure safety to the operators of the bewildering mass of machinery which occupies such a large place in modern industry. This is the first museum of this nature in Great Britain, though similar institutions are in existence in industrial countries on the Continent. The authorities in London aim not only at showing what is already being done in the interest of safety and good health, but also hope by these means to stimulate those concerned in the many ramifications of present day industry to further efforts for improvement.

The exhibition is divided broadly into three sections: "Safety," "Health" and "Welfare." Section I deals chiefly with machinery and in it are exhibited machines showing their safe-guards (either the actual machines or in a few cases models) and photographs. Section II, "Health," is devoted to the most important industrial diseases and includes photographs demonstrating the methods for the prevention of lead poisoning, silicosis, dermatitis *et cetera;* charts which show the incidence of the various diseases; the notices published by the Home Office for display in factories; microphotographs of lung sections *et cetera* and other matters of interest. Ventilation and lighting also come under this section and the exhibits include complete installations for the removal of dust, well-designed and badly designed air ducts are contrasted and photographs are shown of installations actually in use in various industries. In order to secure good lighting in factories a room in the exhibition is set apart in which a number of cubicles are arranged to show the effect obtained by the use of different kinds and arrangements of illumination. Shadow, dirty fittings, reflection, glass wall materials are all dealt with in this department.

One of the recent additions to the museum is an installation showing a method of preventing the workers in stone-cutting processes from inhaling the dust. In another small building is demonstrated the result in workrooms of bad atmospheric conditions, together with methods by which it is suggested these conditions may be satisfactorily altered and the evil either eradicated or at any rate substantially lessened. The fact that noise has a very definitely harmful effect on the health and on the efficiency of the worker is also dealt with and the result is shown of recent experiments to reduce this factor.

A full catalogue of all the exhibits, including the new additions, is published by the Stationery Office and visitors to the exhibition are welcomed.

Rheumatic Clinic.

Some two years ago mention was made of a proposed rheumatic clinic in London, to be organized by the British Red Cross Society, and the public was asked to subscribe to the funds. About £40,000 would be required it was estimated and now that this sum has been received, arrangements have been made for Her Majesty The Queen to open the new central clinic on February 25. An old Baptist chapel in Regent's Park has been converted to this new use and high hopes are entertained that this clinic will only be the first of a chain to extend throughout the country and to be engaged on a definite battle against the scourge of rheumatism. It is claimed that this disease accounts for one-sixth of the total number of hours of work lost every year through illness in this country, so that the important work to be done by these clinics will be realized. Many institutions already attempting to deal with this problem have intimated their willingness to cooperate with the new central clinic and it is hoped that the national scheme will be organized in such a way that all existing institutes will come into line and assist in the coordination of effort. The new clinic will provide treatment for two classes of sufferers. Firstly those industrial workers who come under the National Health Insurance Scheme, and secondly the non-industrial men and women who can afford and will willingly pay a reasonable fee for treatment. It is hoped that the fee charged will be the lowest which will insure that the cost of treatment is covered, and a small percentage put aside for upkeep and further development. Spas, voluntary hospitals and municipal institutions will, it is hoped, be associated with the new scheme and the progress of the scheme if slow should be steady and assured.

Correspondence.

DIATHERMY OF TONSILS.

SIR: The present discussion that has been going on in our journal *re* the most suitable method of removal of tonsils is at a very opportune time, for it is being realized more and more to what extent many diseases are brought about by infection in them and until some better treatment comes along, their removal will be necessary.

Having some years past been endeavouring to bring about reduction or removal of infection by other methods and not meeting with complete satisfaction, I started to use the method described by Frecker in the March 17, 1928, issue and with certain modifications of technique results have been most satisfactory. The unipolar method has been employed. In discussing this method with others who have tried the unipolar method on Watson's Mark I machine, I find that they cannot get sufficient destruction of tissue which results in many and frequent applications before much tonsil is destroyed. With the machine I am using, a Schall, it is possible to enter the point of the needle a third of an inch and move it freely backwards and forwards across the tonsil, completely destroying it to the desired depth. With large tonsils the bulk can be removed by amputation with the needle at the first sitting, only a small amount being left to be dealt with at future sittings. By employing this method the tissues only in direct contact with the needle are destroyed, whereas with the bipolar method the heat is coming from the tissues to the needle and what are not actually destroyed may be more or less damaged, resulting in a tendency to much reaction and swelling and in inexperienced hands liability to deep burns.

During the last two years over six hundred tonsils have been removed by me by this method. There has been a varying amount of pain and reaction which with experience can be largely obviated. The reaction after the first treatment is usually the worst and is mainly due to toxic absorption from stirring up the infection; it acts like a dose of vaccine and if reasonable time is not given before the second treatment, the patient will be caught in the negative phase. The third, fourth or any subsequent treatments are usually free from pain or reaction. The actual operation should be quite painless and the sucking of an aspirin usually suffices to keep down any after pain. None of my patients has had to lie up after and in most cases they go straight back to their work. It does not matter how old or frail the patient or how weak his heart, for him to stand it. On one or two occasions there has been a little difficulty with hæmorrhage in old people with high blood pressure several days after the diathermy and once or twice during the operation. Sparking on to the spot usually suffices. In one case hæmorrhage started rather freely when I was doing the opposite tonsil, but the application of 25% glucose solution stopped it promptly. At times with deeply buried tonsils it is not easy to be sure when you have got to the capsule; on such occasions it is well to wait a week or two and the fossa will contract down, bringing to light any piece of tonsil present. I am rather inclined to agree with Dr. Kent Hughes about leaving small bits, because if they are infected, it is usually apparent and, if not, they shrink up and become pale and can always be removed if necessary with very little trouble. A thin film of tonsil adjoining the capsule in the majority of cases will quickly become free of infection, if there is no depth to allow of retention in crypts. Personally I remove all visible tonsillar tissue rather to prevent anybody saying a piece has been left and so condemning the process than that I really think it is always necessary, although fully aware that a definite piece of tonsil can carry on an infection. Occasionally an old retrotonsillar abscess may come to light when one thinks all has been cleared up, but it is not long before this becomes obvious and the sac laid freely open.

As during the next ten years or so three-quarters of the population will be having their tonsils removed, it is well to consider the easiest and safest method to employ and there is no shadow of doubt that in diathermy we have the method of election except in young children.

Yours, etc.,

S. Pern.

12, Collins Street, Melbourne.
February 16, 1930.

THE ÆTIOLOGY OF RODENT ULCER.

Sir: In regard to my letter published in the last issue of the journal (March 29, 1930), I omitted the word "usual" in the following sentence, which included should read: "in *xerodermia pigmentosa*, prickle cell carcinoma and not rodent ulcer is the usual accompanying malignant growth."

Yours, etc.,

Norman Paul.

"Harley,"
143, Macquarie Street,
Sydney.
April 2, 1930.

Sir: As one unaccustomed to polemics and unversed in rhetorical devices I hesitate in entering an open discussion on the theories relating to the causation of rodent ulcer. My excuse for intruding is based on the hope that the viewpoint of a radiologist on this subject will indicate the difficulties he experiences in analysing the conclusions drawn from certain evidence produced in recent communications to the journal.

The theorist should not expect to convince all with his hypothesis, however satisfying it may be to himself and however sincerely and emphatically he may assert it. This applies especially when some parts of the evidence supporting the theory are assumed without proof and other parts are used before excluding alternative interpretations. The fact that objections are not raised immediately does not negative their existence.

In the present state of knowledge concerning cancer genesis it behoves us to examine patiently and thoroughly any theory claiming to explain the cause of any particular form of the disease. The behaviour of the exceptional case if adequately investigated may also reveal much of importance in the causation and treatment of the disease in general.

Dr. Molesworth in his thesis (June 18, 1927) concludes that ionization by ultra-violet rays is the predominant factor in the production of rodent ulcer. He supports this hypothesis with eight clinical and pathological observations which may be summarized as follows: (i) The disease occurs most frequently in men in exposed, outdoor occupations; (ii) affected women admit outdoor habits; (iii) the lesions are generally on the face, neck and upper chest; (iv) rodent ulcer is usually accompanied by stigmata of sunburn; (v) rodent sufferers tend to have a characteristic complexion; (vi) squamous epithelioma also develops in precedent keratoses; (vii) epithelioma of the lip is characterized as an effect of sunburn; (viii) a non-committal quotation from Darier on the cause of skin epitheliomatosis containing no mention of the method of action of sunlight in producing rodent disease.

I find it difficult to agree that in these observations there is much and strong evidence for the hypothesis that ionization by the ultra-violet component of sunlight is the predominant factor in the production of rodent tumour.

From the closest scrutiny of this evidence with "as little interference by prejudice or preconception as is possible to my mind," I conclude that rodent ulceration (i) is prone to arise in certain areas of the skin of patients with a certain characteristic complexion and (ii) the incidence of the disease is apparently higher in these patients in countries of sunshine. These observations have been made on many occasions and each is equally important.

I do not deny to solar energy and atmospheric conditions an all important rôle in rodent causation in many instances. To go any further is only guess-work until some attempt at least is made to show (i) that the ultra-violet component of sunlight is concerned in these reactions and (ii) that if this is so, the effects produced in the tissues are due to ionization.

The eight clinical and pathological observations epitomized above do not make this attempt. The experimental work of Findlay is also of no value when tested in this manner. The lamp used emitted a wide range of wave lengths. It is stated that the infra-red rays were deficient, but it is not clear if this means in quantity or in biological effectiveness. The visible light rays are conveniently forgotten. Most of the exposures were made to areas irritated by tar applications. The tumours obtained presented difficulty in classification and no serious application of the results of the animal experiments to cancer occurring in man was made. Above all, no word was written on the subject of ultra-violet rays producing skin cancers by ionization.

Dr. Molesworth takes no evidence from his histopathological studies in support of his hypothesis. Nor is it to be expected. Ionization by ultra-violet light is a molecular phenomenon and produces its immediate effects in a sphere outside the degree of refinement of the microscope.

It is regretted that the admirable histological discussions do not include observations on the tumour stroma and environment in the various types encountered. It is conceivable that cancer genesis is connected with an upset in biological units as opposed to variations in individual cells. The temptation to wander in this fascinating domain must be resisted.

To return to our difficulties. Ionization is the process by which a chemical substance becomes a conductor of electricity. The ionizing agents include X rays and ultra-violet rays. Suitable trauma cannot be excluded. The radiations are unable to ionize a substance directly and

the observed ionization is due to the corpuscular rays produced. In general the more penetrating a ray is, the less it will ionize per unit length of its path. This contradicts the idea that it is scientifically established that ultra-violet rays are inferior in their ionizing ability to X rays.

Even if "physicists agree that X rays and radium rays produce their effects by means of ionization of the substances irradiated," radiologists are by no means unanimous in agreeing that the biological effects of these agents admit of a purely physical explanation.

Our knowledge of the method by which radiation produces ionization is largely hypothetical. The sequence of phenomena is apparently very complicated. Only the rays that are absorbed, scattered or transformed are effective and it is with these energy exchanges that we are concerned. The factors determining the result in a particular instance cannot be discussed in this place. Broadly, the rays may produce: (i) A specific effect in which all of the energy of the ray is given up to moving electrons. This requires a definite wave length of the radiation and a definite structure of the irradiated body. This reaction is independent of temperature changes. The emitted negative particle immediately becomes the nucleus of a cluster of uncharged molecules. A similar fate befalls the positively charged atomic or molecular remainder. These electrified particles are the ions. It is bewildering to endeavour to follow the possibilities when absorbed radiation increases the ionic content of the tissue colloids and fluids. It affords inspiration for the romantic writer. (ii) A non-specific effect in which the rays give up part of their energy to the electronic systems without separating any electrons. This increases electronic motion and Dessauer considers that this effect produces minute, discrete heat points (*Punktwaren*) in the irradiated substance and in the tissues is the ultimate basis of the biological response. This type of reaction is important in radiation absorption.

It may be said that the physical effects depend on the quality and quantity of the rays and the structure of the irradiated substance. The energy exchanges are definite and although highly complex may be precisely recorded. The biological sequelæ—tumour formation or tumour regression—depend on the tissues themselves and the factors determining changes in them (metabolism, function, heredity, pre- and post-natal developmental defects, local and constitutional diseases, trauma).

So even if ionization of the irradiated tissues is granted, we are still without information concerning the particular chemical, electrical and thermal changes required to provoke the biological response that will end in disease and how it should differ from that required to cure disease.

Dr. Moppett in his experiments delivered equal intensities of monochromatic X rays to the surface of his chick tissue without attempting to estimate the amount absorbed and with no special account of the chemistry of these tissues. In the circumstances this work has little or no application in a discussion of tissue ionization by radiation. The eminent authorities quoted also fail in this regard.

After considering all Darier wrote: "*Quant à la cause directe de l'épithéliome et des tumeurs cancéreuses en général on l'ignore.*" I concur.

Yours, etc.,

F. J. GWYNNE.

Auckland.
March 23, 1930.

MEDICAL ETHICS.

SIR: Your recent leading article concerning the delicate subjects of ethics, etiquette *et cetera* was so devastatingly dogmatic and so perfect an exposition of the theory of the divine right of doctors that I tremble lest the general public be misled into accepting it as the view of each and every medical man. Will you, therefore, grant me sufficient rope that I may the more satisfactorily hang myself before the eyes of the die-hards.

May we examine for one moment some impressions which your article intends to convey.

1. "One fails to see that the personal has any 'news value' in matters medical."

Obviously this is false. Newspaper editors are surely the best judges of what is "news value" and what is not. We would resent being told by a journalist what is of "therapeutic value" and what isn't. Is a medical man to judge what is of "news value" and what isn't?

We were all interested to know the names of the King's medical men in His Majesty's recent illness. I am not arguing about the fact of such knowledge being desirable; I am merely commenting on its appeal. When important people in our midst become ill and need the attendance of important specialists, the general public are just as interested in the "*dramatis personæ*" as in the names of those members of the bar conducting a thrilling drama of the courts.

We all deplore this kink of human nature and a decent doctor tries to prevent its gratification. But to deny its existence is merely a medical exemplification of the doctrines of that last word in modern foolishness, Christian Science.

2. "It is often difficult for a doctor to prove that he was not responsible for his own publicity."

On the other hand, I hold the opinion that it would be extraordinarily difficult for any committee to prove that he was, unless one puts back the clock of time and assumes the accused guilty till he proves himself innocent.

3. "The University of Sydney deserves severe censure for its giving of news and photographs of medical professors."

The trouble about the Senate, of course, is that it contains quite a lot of men who belong to other professions and therefore see no harm in pictorial news. We must remember that if we and the dentists put forth a doctrine to which 95% of the community refuse to subscribe, we have no divine right to enforce it on them. You will never convince a newspaper man (or any other professional person) that there is any fundamental difference between a literary and a photographical sketch. You will never convince any but members of our own profession that it is right for the University to give a *résumé* of a professor's attainments and wrong to give his photograph. The attitude too much resembles the churchman who says it is quite right to amuse oneself reading a novel on Sunday, but quite wrong to find amusement in a game of tennis!

With apologies for the unfortunate length of this letter, may I add just the briefest word of comment on the refusal our committee gave to the courteous invitation of the President of the Institute of Journalists. The President happens to be a man of some scientific attainments. His recent book on Australian bird life has received the highest commendations from important journals the world over. That is by the way and may perhaps convince some of my more elderly readers that newspaper men are often quite educated and intelligent people. (I understand that the editor of another Sydney newspaper is a member of the University Senate and that the news editor of yet another is a Rhodes scholar.) To refuse to meet gentlemen like these is surely discourteous and liable to give unforgivable offence. It is also "bad staff work," as one used to say in other days.

It would have been so easy to "wipe the eye" of our friends the journalists. We could have met them with every genuine expression of enthusiasm for the improvement of the public health. And we could have begun by insisting as our first plank that all newspaper advertisements relating to health matters be first passed as truthful by a joint committee of both professions with a medical man as chairman and empowered to give a casting vote. That would have been a perfectly reasonable request and one sufficiently penetrating to test the sincerity of our friends the journalists. Is it too late?

In case a journalist should read this letter and give my defence of his President undeserved personal publicity, I ask you, Sir, to be good enough to allow me to sign myself

"MERELY A G.P."

The Union,
Sydney University.
March 26, 1930.

THE MANSON MEMORIAL FUND.

The Editor wishes to acknowledge the receipt of a donation of one guinea from Dr. Alfred Jacobs, of Yarloop, Western Australia, to the Manson Memorial Fund.

LISTS OF MEMBERS.

The lists of members of the several Branches of the British Medical Association in Australia are now available. Copies can be purchased from the office of The Medical Journal of Australia at one shilling each.

Diary for the Month.

April 15.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
April 22.—New South Wales Branch, B.M.A.: Medical Politics Committee.
April 22.—Queensland Branch, B.M.A.: Obstetrical Section.
April 23.—Victorian Branch, B.M.A.: Council.
April 24.—New South Wales Branch, B.M.A.: Branch.
April 24.—South Australian Branch, B.M.A.: Branch.
April 25.—Queensland Branch, B.M.A.: Council.

Medical Appointments.

Dr. Lawrence Edward Odlum (B.M.A.) has been appointed Resident Medical Officer at the Royal Hospital for Women, Paddington, New South Wales.

* * *

Dr. F. B. McCann (B.M.A.), Dr. D. H. K. Lee, Dr. C. H. Fitts (B.M.A.) and Dr. G. H. Moore (B.M.A.) have been appointed Quarantine Officers under the *Quarantine Act*, 1908-1924.

* * *

Dr. Charles Stewart Barbour (B.M.A.) has been appointed Honorary Pathologist and Bacteriologist at the Port Pirie Hospital, South Australia.

* * *

Dr. C. H. Callagher (B.M.A.) has been appointed by the Northampton Local Board of Health (Western Australia) Medical Officer of Health under the *Health Act*, 1911-1919.

* * *

Dr. W. J. Pannell (B.M.A.) has been appointed a member of the Goomalling and District Hospital Board (Western Australia) under the provisions of the *Hospitals Act*, 1927.

* * *

Dr. J. H. Blackburn (B.M.A.) has been appointed Government Medical Officer at Boonah, Queensland.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi.

Children's Hospital, Incorporated, Perth, Western Australia: Junior Resident Medical Officer.

Department of Inspector-General of Hospitals, Parkside Mental Hospital, South Australia: House Surgeon.

Launceston Public Hospital, Tasmania: Two Resident Medical Officers (male).

Maryborough Hospitals Board, Queensland: Junior Resident Medical Officer.

Medical Department, Perth, Western Australia: Medical Officer.

Swan Hill District Hospital, Victoria: Resident Medical Officer.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
New South Wales: Honorary Secretary, 21, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phœnix Mutual Provident Society.
Victorian: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
Queensland: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting apopintments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Mount Isa Hospital.
South Australian: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
Western Australian: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
New Zealand (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of The Medical Journal of Australia, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to The Medical Journal of Australia alone, unless the contrary be stated.

All communications should be addressed to "The Editor," The Medical Journal of Australia, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Subscription Rates.—Medical students and others not receiving The Medical Journal of Australia in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.